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IN THIS ISSUE

ll Denture Construction With Stress on Elimination of Laboratory Processing Errors ..152

rylic Cranioplasty 157

spal Fracture Odontalgia ..158

e Origin of Cancer 160

rect Acrylic Resin Inlays ...161

dy Chemistry in Health and Disease 164

dium Fluoride in the Drinking Water of Mice 170

e Hand and Cardiovascular Disease 172

inical and Laboratory Suggestions 174

edicine and the Biologic Sciences 176

(A complete table of contents appears on page 151)

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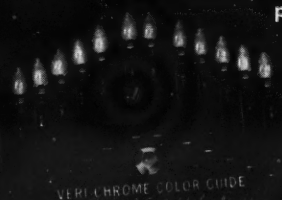

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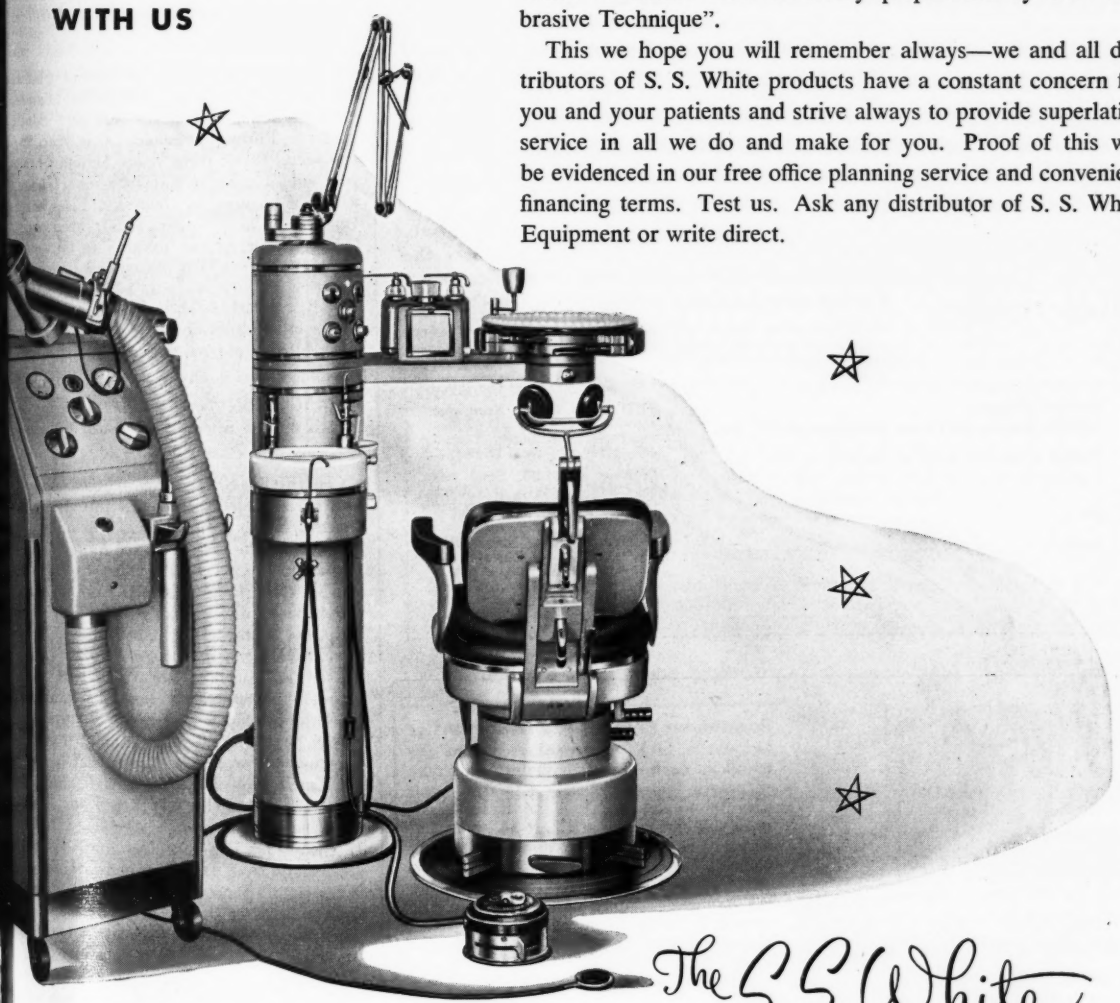

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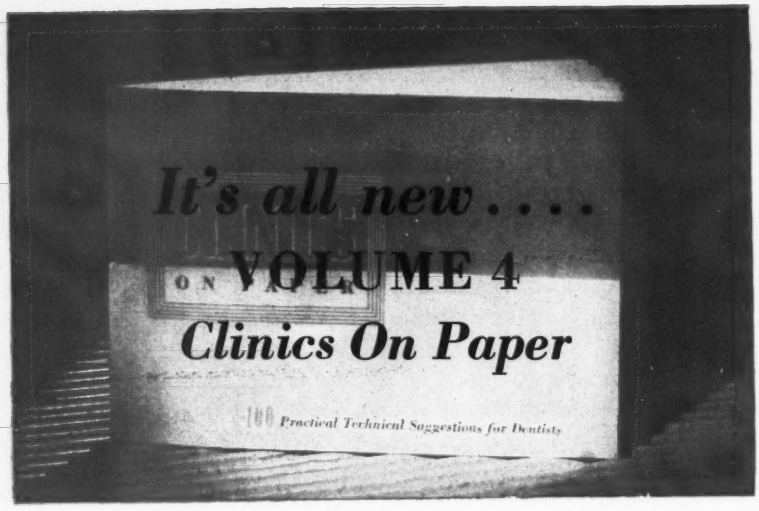

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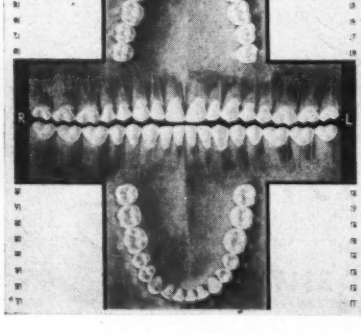

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Full Denture Construction With Stress on Elimination of Laboratory Processing Errors—Part One
Elias Lisman, B.A., D.D.S. 152

Acrylic Cranioplasty (An Abstract)
Henry W. Dodge, Jr., M.D. and Winchell McK. Craig M.D. 157

Cuspal Fracture Odontalgia
Captain John W. Gibbs, (DC) 158

The Origin of Cancer (An Abstract) 160

Direct Acrylic Resin Inlays
Roger K. Stockton, D.D.S. 161

Body Chemistry in Health and Disease—Part Eight
Melvin E. Page, D.D.S., and D. L. Brooks, A.B. 164

Sodium Fluoride in the Drinking Water of Mice
Alfred Taylor, Ph.D. 170

The Hand and Cardiovascular Disease (An Abstract) 172

The Editor's Page ..... 173 Contra-Angles 183

Clinical and Laboratory Suggestions 174

1. Relieving Castings. 2. Mounting Discs. 3. Removal of a Matrix Band. 4. Restoration for Fractured Anterior Teeth. 5. Arranging Surgical Instruments in Cabinet. 6. Thinning Tuberosity of Dentures.

Medicine and the Biologic Sciences 176

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ELIAS LISMAN, B.A. (Washington Square College, New York University, 1939), D.D.S. (New York University, College of Dentistry, 1942) is a general practitioner who emphasizes children's dentistry in his practice. Doctor Lisman has published an article on the subject of the training of the child dental patient. For his first appearance in DIGEST, he presents FULL DENTURE CONSTRUCTION WITH STRESS ON ELIMINATION OF LABORATORY PROCESSING ERRORS.

JOHN WILLIAM GIBBS, Captain (DC) (Loyola University, 1946) is a specialist in periodontia and first published in DIGEST in 1950. In the current issue Doctor Gibbs presents CUSPAL FRACTURE ODONTALGIA.

ROGER K. STOCKTON, B.S., D.D.S. (University of Illinois, College of Dentistry, 1939) is a general practitioner. Doctor Stockton was instructor in crown and bridge technique in the University of Illinois College of Dentistry for two and a half years. For his third appearance in DIGEST Doctor Stockton presents DIRECT ACRYLIC RESIN INLAYS.

MELVIN E. PAGE, D.D.S. (University of Michigan, College of Dentistry, 1919) Director of the Page Foundation for biochemical research in St. Petersburg, Florida, and his assistant, D. L. BROOKS, A.B. (Wheaton College, Norton, Massachusetts, 1931) present two case histories taken from their files in which the application of the Page endocrinologic approach to dental and general disease is described in detail.

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EDWARD J. RYAN, B.S., D.D.S., Editor

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FULL DENTURE *Construction with Stress on Elimination of Laboratory Processing Errors – Part One*

ELIAS LISMAN, B.A., D.D.S., Irvington, New Jersey

DIGEST

Many full dentures fail to satisfy or render satisfactory service to the patient because of laboratory processing errors which are tolerated by the dentist. These errors stem from two sources: (1) the commercial laboratory does not follow the dentist's directions explicitly, or the directions and prescription given the laboratory are not explicit enough to be followed accurately; (2) errors occur from the nature of the technical procedures themselves.

The technique described for construction of full upper and lower dentures is one which ensures a maximum of cooperation and accuracy by the commercial laboratory. The errors which may be introduced by laboratory procedures are minimized or compensated for.

Advantages of Technique

In this technique the following advantages are noted:

1. The patient is provided with well-fitting, well-functioning esthetic dentures which will be relatively free of sore spots and the need for numerous time-consuming and irritating adjustments.

2. The procedures can be accomplished with the minimum amount of chair time and effort on the part of the dentist. The technique adheres to the basic principles of full denture construction; namely, (1) adequate impressions which provide complete coverage and adaptation to tissue areas and complete peripheral seal that allows muscles to function freely: (2) correct centric occlusal relations and vertical openings; and (3) balanced occlusion in all excursions.

Preliminary Measures

1. A complete series of x-rays and upper and lower study impressions are taken.

2. Preextraction photographs and facial measurements may be taken.

3. Following the completion of necessary surgical procedures, and a thorough clinical examination, the denture construction may be started.

First Visit Procedures

1. Preliminary compound upper and lower impressions are taken. These impressions are over-extended "snap" impressions which cover all the tissue areas ultimately to be covered by the finished denture (Fig. 1).

2. The impressions are dried and an outline of the desired border extensions is drawn on the compound with an indelible pencil (Fig. 2). This is done while the patient is still in the chair. The completed outlines can then be compared with the tissue deflections as seen in the mouth.

3. The impressions are given to the laboratory for pouring of plaster models.

4. On separation of the compound from the model, the borders outlined on the impressions will be clearly seen on the plaster (Fig. 3). The laboratory traces this outline afresh with another indelible pencil.

5. All undercuts on the model are filled in with plasticine or modeling clay.

6. A base tray is constructed on the prepared model using one of the quick-setting plastic tray materials generally available. The borders outlined on the model will be clearly transferred to the tray (Fig. 4).

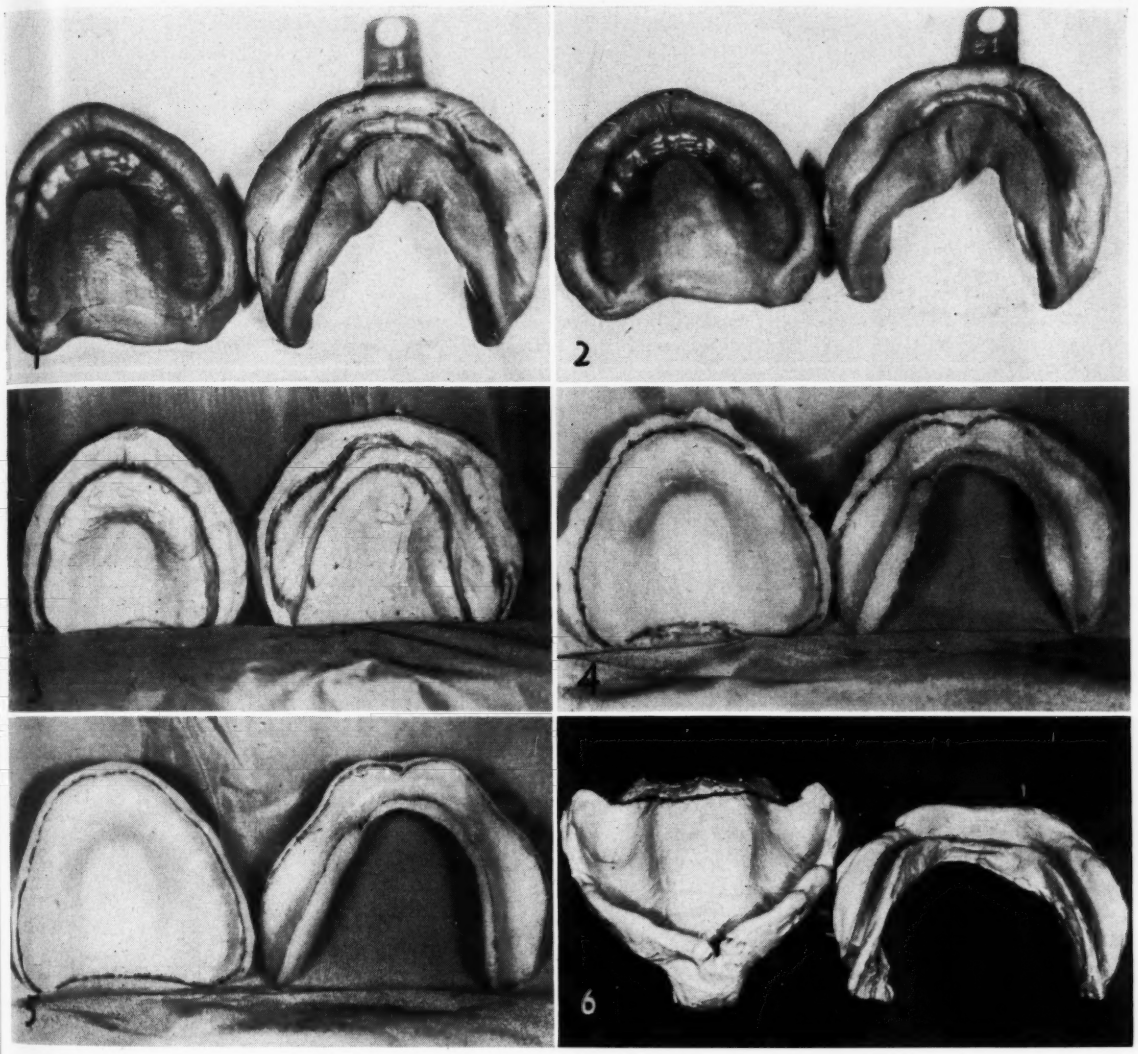
7. This tray is trimmed with a large lathe wheel to the pencilled outline (Fig. 5). The borders are left 1/8 inch thick all around except in the upper buccal space area and the lower lingual frenum area, where 3/16-inch borders are maintained.

Imperfect Trays Avoided—(1) By following the border outlines made by the dentist at the chair, and (2) by using plastic bases rather than shellac baseplates, the laboratory will not return warped trays with borders which are too thin, too short, or too long.

Minimum Adjustment Required—Before the trays can be used in the taking of impressions a minimum of chairside adjustment is required by the dentist.

Second Visit Procedures

1. The plastic trays are tried in the mouth.



1. ***Preliminary compound upper and lower impressions, including all the areas which will be covered by the completed dentures.***

2. ***Border extensions outlined on compound with indelible pencil.***

3. ***Casts made from compound impressions, showing transfer of border outlines onto plaster.***

4. ***Plastic base tray, untrimmed, showing transfer of border outlines.***

5. ***Plastic base trays trimmed to pencilled outline.***

6. ***Final upper and lower paste impressions, showing posterior border of upper traced with indelible pencil.***

2. Muscle attachments are further relieved if necessary.

3. Overextensions, if found, are reduced.

4. Borders which may be too thick are reduced.

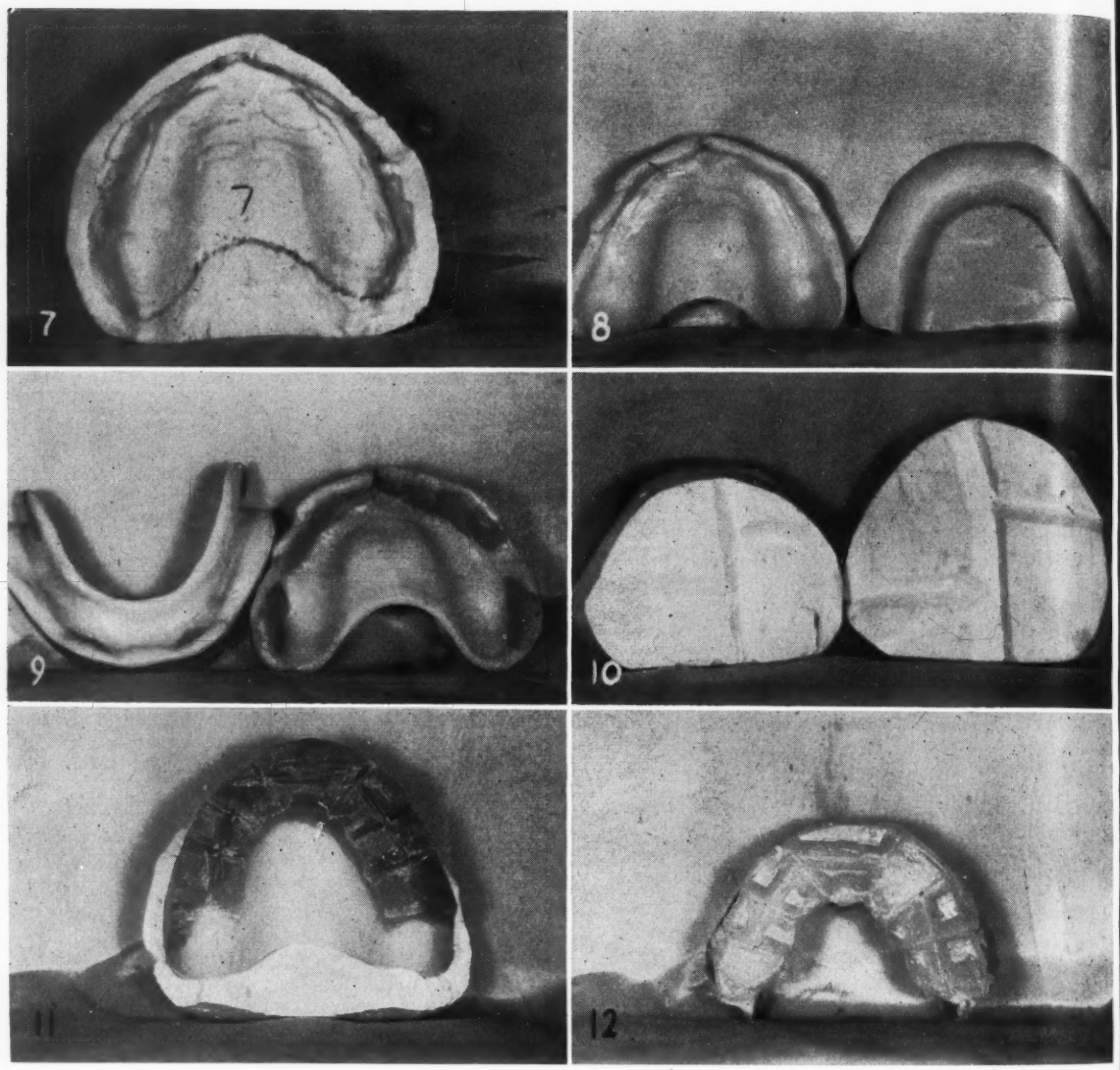
5. If any border area has been underextended or made too thin, correction is made with soft carding wax. This wax can be quickly and easily added to the base by molding with the fingers. No heating is necessary.

Functional Tests—The lower tray is tested by having the patient make normal, unstrained functional movements:

(1) The patient opens and closes the mouth several times. If the base is dislodged, the borders in the buccal flange area at the buccinator attachment are overextended.

(2) The patient wets the lips with the tongue. If the base is dislodged, the lingual frenum area is overextended, usually in thickness of the border, not in depth.

(3) The patient touches the corners of the mouth with the tip of the tongue. If the base is dislodged by this movement, the borders are overextended in the mylohyoid attachment area on the side opposite that which the tongue touched. The upper base tray should extend posteriorly slightly beyond the desired posterior extension of the finished denture.



7. *Upper stone cast showing transfer of postdam line.*

8. *Final acrylic bases.*

9. *Undercut areas of acrylic bases filled in with plasticine.*

10. *Back of plaster models showing notches.*

11. *Upper wax bite-rim with grooves.*

12. *Lower wax bite with ridges created by grooves of upper bite rim.*

Time Consumed—These functional adjustments of the trays should not take more than five minutes.

Final Impressions Taken—The trays are thoroughly dried and final impressions are taken using one of the zinc oxide and eugenol impression pastes. Before dismissing the patient, the position of the posterior border of the upper denture is traced on the impression using an indelible pencil (Fig. 6). The extent of the postdam area can likewise be outlined if desired.

Impressions Processed—The impressions are given to the laboratory for processing. The impressions are boxed to preserve border width and length. Hard stone models are poured. The postdam outline will be found clearly marked on the upper cast when the models are separated (Fig. 7).

Stone Model for Postdam—If the laboratory has been properly instructed and trained, the cutting of the stone model for the postdam can be left to the technician. If not, the model is returned to the dentist for the postdam.

Acrylic Bases Processed—From these accurate models of the patient's mouth, with accurate border extensions, acrylic bases are processed with the same care ordinarily given to processing finished dentures (Fig. 8). The trays should be a minimum thickness of one sheet of baseplate wax; the full thickness of the borders as determined by the impressions must be duplicated.

Cold-curing Acrylic Preferred—No

relief for the torus palatinus is provided before processing. The wax-up is made heavier in this area, however, so that if relief should become desirable at a later time, it can be cut into the finished denture when necessary. These acrylic trays will be incorporated as part of the finished denture. The author prefers the use of the cold-curing acrylics because of their high dimensional stability.

Imperfections in Trays Removed—The trays are not polished but (1) all rough edges are made smooth, (2) the tissue surfaces of the bases are examined carefully, (3) all tiny spicules and roughnesses, such as might be produced by minute bubbles in the stone model, are eliminated with a small stone or bur, and (4) all tiny air bubbles, that might be present from careless processing, in the acrylic itself are filled in with acrylic using the brush-on technique.

Working Models Formed—All undercut areas in the tissue surface of the bases are now filled in with plasticine or modeling clay (Fig. 9). Care is taken not to cover any of the alveolar crest areas. Plaster is poured into the base to make working models from which the finished bases may be removed and accurately replaced. The back of the models thus formed are grooved or "keyed" with deep indentations or grooves using a knife or large coarse lathe wheel.

Third Visit Procedures

The final acrylic bases are tried in the mouth. At this time retention and stability can be positively tested. If either is lacking, new impressions can be taken immediately, using the acrylic bases as trays.

Wax Bite-rim Made—Border thickness and length are again tested at this point, and corrected if necessary. Time need not be wasted in polishing such corrected areas. A bite-rim is now made on the upper denture base; the wax is chilled in ice water. Grooves are cut into the occlusal surface of the wax with a knife (Fig. 11). A wax bite-rim is made for the lower denture base. This is not chilled, but allowed to remain soft.

Further Procedural Steps—1. The upper base is placed in the patient's mouth. The lower base with the softened bite-rim is then inserted. The patient is instructed to bite into the soft wax and is guided into centric relation.

13. ***Face-bow record in mouth.***

2. The bases and bite-rims are removed and chilled in ice water. The lower rim will now have ridges corresponding to the grooves on the upper bite-rim (Fig. 12). These ridges and grooves provide a positive bite relation of the casts for mounting on the articulator by the laboratory. No sealing together with staples or luting of wax is necessary.

3. A face-bow bite fork is heated and sealed into the upper bite-rim, care being taken not to distort the occlusal wax markings. This is best done by keeping the upper and lower rims in contact while seating the hot bite fork.

4. A face-bow transfer record is now made (Fig. 13), and sent to the laboratory for mounting.

5. The mold and shade are selected before dismissing the patient. If the extracted teeth have been saved, they can be used as a guide to tooth selection.

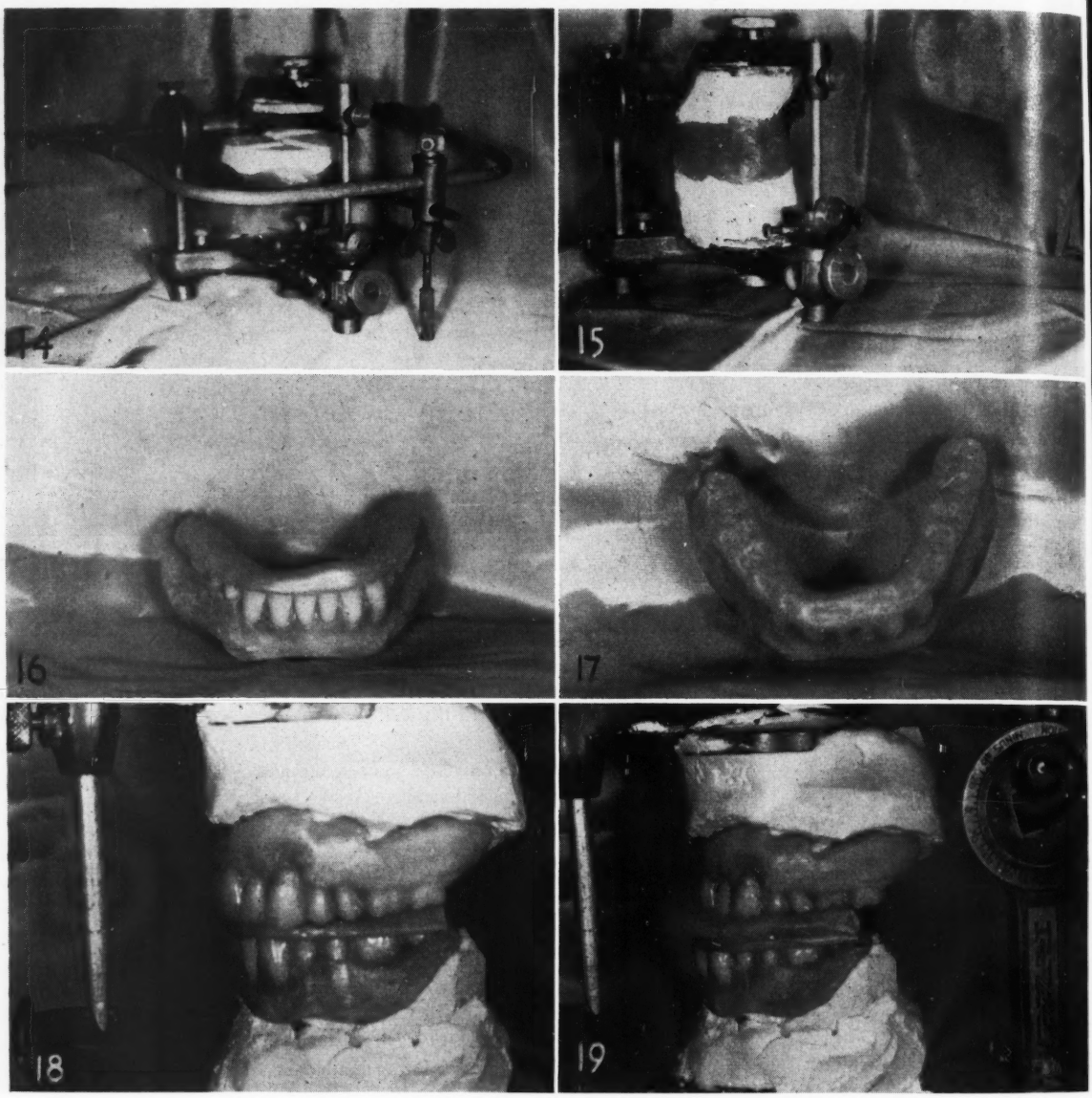
6. The casts are mounted by the laboratory on an adjustable articulator (Figs. 14 and 15). The author prefers the Hanau Articulator Model H. Teeth are set up on the acrylic bases in the conventional manner, using hard wax to secure the teeth.

Fourth Visit Procedures

The setup is tried in the mouth. The patient is asked to look at the teeth, but only with respect to the size, shape and shade of the teeth themselves. No attention is given to facial contours and appearance at this time. If the mold or shade selected is not satisfactory, another mold can be substituted at the next visit.

Vertical Opening Checked—Phonation, freeway space, facial appearance, and the subjective feelings of the patient are observed. If adjustment of the vertical opening is required, it is done immediately while the patient is in the chair. Precise interdigitation of the posterior teeth is not necessary. The teeth must be securely luted to the wax and bases.

Centric Relation Established—(1) The upper base with teeth is inserted in the patient's mouth. (2) Two thicknesses of baseplate wax are softened and molded over the lower teeth (Fig. 16), and the lower base is inserted. (3) The patient is instructed to place the tip of the tongue as far back on



14. ***Face-bow record transferred to articulator, ready for mounting of upper.***

15. ***Upper and lower bases mounted with bite-rims articulated.***

16. ***Lower setup with two thicknesses of softened wax over teeth.***

17. ***Lower setup showing markings of upper teeth in wax after centric bite.***

18. ***Centric bite replaced on articulator. Upper teeth fit into markings on wax.***

19. ***Protrusive bite on articulator.***

the palate as possible, and then close slowly into the softened wax.

Teeth Must Fit Accurately—(1) The bases are removed and chilled in ice water (Fig. 17).

(2) If the wax has been bitten through so that the procelain of the lower tooth is visible, the reading must be discarded and the offending tooth reset before another record is taken.

(3) Guide planes in the wax are cut off with a scalpel or sharp wax carying knife.

(4) The bases are placed on the articulated models and the articulator closed. The upper teeth should fit accurately into the lower markings (Fig. 18) with the condyle elements at the bottom of the condyle guide slots.

Bite Record Retaken—If the upper teeth do not fit into the wax markings, the wax is removed from the lower teeth and the centric bite record is retaken in the same way as before. If the articulator setting again does not coincide with the markings

from the mouth, the casts must be reset using the wax bite as a guide. The new mounting is checked by taking another bite record from the mouth. When two successive records from the mouth coincide exactly with the articulator setting, correct centric relation has been established.

Protrusive Records Taken—(1) The upper base is inserted.

(2) Four thicknesses of baseplate wax are luted to the lower teeth, and the lower base is inserted.

(3) The patient is instructed to move the lower jaw forward and bite into the wax.

(4) The wax is chilled in ice water and the bases placed on the articulator (Fig. 19).

(5) The condylar inclination is adjusted to the portrusive bite record, and the degree of condylar inclination is noted.

Condylar Inclination Established—The protrusion bite record is repeated twice more and the three readings averaged for the establishment of the condylar inclination. The incisal guidance is maintained at zero degrees.

Teeth Reset by Laboratory—The excess wax is removed from the teeth and bases and the bases placed in the mouth. The lip length and the midline are observed and corrections necessary are noted. The laboratory now resets the teeth to the newly established centric and vertical relation, and reestablishes the occlusion of the posterior teeth. The anterior teeth are changed to a more favorable mold and shade if necessary.

Comment

The use of acrylic bases for the bite and try-in procedures provides for accuracy in record transfers that can be achieved in no other way. Distortions and warpage common with shellac baseplates are eliminated.

(To be concluded)

1034 *Clinton Avenue.*

Acrylic Cranioplasty

HENRY W. DODGE, JR., M.D., and WINCHELL McK. CRAIG, M.D., Rochester, Minnesota.

Use of Transparent Acrylic

Interest in the use of acrylic plastic in neurosurgery began during World War II when studies on injuries to the brain in monkeys were carried out by the replacement on removed calvarium with transparent acrylic.

Substitution of Acrylic Plastic for Tantalum Considered—Results of these experiments raised the question of the use of acrylic plastic in place of tantalum, and the employment of allied metallic substances for the repair of cranial defects. This has been done and reported by others, but the problem of curing the acrylic plate was time consuming and necessitated a delay at the operating table.

Recent Demonstration—A demonstration was recently given of a technique for the rapid repair of cranial defects by the use of acrylic plastic (pentocryl) used for making dentures.[1] For some time we had been searching for a material which would permit the rapid performances of cranioplasty in primary operations involving large areas of removal of bone for access to such tumors as meningiomas, and for the repair of posttraumatic and other defects in the skull.

Acrylic Cranioplasties Performed

In recent months acrylic cranioplasty has been performed with pentocryl in a series of dogs and for seven patients. Bacteriologic studies on the material have proved that the material when mixed is sterile, and that it is well tolerated by the tissues.

Advantages of Material—It was found that this material has several advantages: (1) It is easily molded into the cranial defect after it is mixed as a paste and poured into place. (2) It can be molded with the fingers easily and to any size or shape, and when once it becomes hardened it is solid, hard to break, and has a small element of flexibility which prevents distortion from bending such as may occur in a steel or tantalum cranioplasty. (3) Changes in atmospheric temperature do not cause discomfort to the patient, and the plates are radiolucent.

Other uses for Material—It is possible that if the method under consideration proved satisfactory there might thus be available a means (1) for rapid repair of cranial defects, (2) for plugging of bur holes following craniotomy, (3) for the repair of defects in the skull which follow the removal of bone during the course of operation for brain tumor, and (4) for the covering of defects in the orbit after transcranial removal of orbital tumors.

Method Extremely Rapid—Once the defect in the skull has been prepared for cranioplasty, the mixing of the plastic material and the preparation of the plate require approximately eight to ten minutes. This is an exceedingly rapid method, and in many cases the fit of the plate to the skull and to the bony defect is so satisfactory that wiring or suturing of the plate into position is considered unnecessary.

Preliminary Report

This preliminary report is presented in the hope that others may use the method and thus augment the authors' experience with the material, and also in the hope that others might find additional uses for this material. It must be reiterated that to the present the experience with a number of cases and with the end results is somewhat limited. The longest follow-up record among the clinical patients is approximately five months.

Adapted from *Proceedings of the Staff Meetings of the Mayo Clinic* **28**:256-257 (*May* 6) 1953.

[1] Woringer, E., Schwieg, B., Brogly, G., and Schneider, J.: Nouvelle technique ultra-rapide pour la rejection de bréches osseuses craniennes à la résine acryline. Advantages de la résine acrylique sur le tantale, Rev. Neurol, **85**:527-535 (Dec.) 1951.

CUSPAL FRACTURE *Odontalgia*

CAPTAIN JOHN W. GIBBS, (DC), Munich, Germany

DIGEST

Claim to any new clinical entity is not made in this article; the existing dental literature of the past fifty years makes such a claim virtually impossible. It is believed, however, that because of increasing occurrence, the type of odontalgia described herein should be listed as a specific clinical entity in modern literature, and means for (1) its detection, (2) differential diagnosis, (3) evaluation and prognosis, and (4) treatment should be clearly defined and made available to the beginning practitioner. Such a course will increase the conservation of teeth and provide the dentist with an additional means of achieving better oral health.

Results of Conservative Treatment

The occurrence of this type of odontalgia is increasing for the simple reason that dentistry is becoming progressively more conservative. Procedures other than extraction for relief from pain are increasingly demanded by a more tooth-conscious public. The patient is thoroughly aware of the means at the dentist's disposal to preserve and retain teeth. It is the rare dentist, therefore, who will not go to great extremes to retain a healthy tooth. As a result of conservatism many teeth are, of a necessity, extensively prepared and extensively restored.

Weakened Teeth Retained—Although conservative management leads to the retention of many healthy, serviceable teeth, it also leads to the presence in mouths of many severely weakened teeth, particularly in the cuspal areas where much occlusal stress is brought to bear.

Other Conditions Conducive to Cuspal Fracture—It is not implied that cuspal fracture occurs only in carious or restored teeth. The morphology of a tooth, incorporating inherent weakness, and its occlusion in the arch may make a sound tooth prone to cuspal fracture under normal stress.

Common Sources of Fractures—Also, such considerations as shot in game, stones in peas, and bits of bone in food are quite capable of fracturing any tooth. Most cuspal fractures of an obscure nature, however, will be found in restored teeth.

Factors Determining Choice of Treatment—It is difficult at times to determine when a tooth has been sufficiently weakened by caries or preparation to warrant other than routine alloy or inlay restorative procedures. Many factors also enter into the choice of restorations: (1) the condition of other teeth, (2) condition of supporting structures, (3) cooperation of the patient, and (4) the financial status of the patient. An alloy or an inlay, therefore, might well be used where a full cast crown would be the restoration of choice.

Conditions Favorable for Fracture—From the two factors described, (1) weakening of cusps from caries, and/or (2) preparation, and (3) occasionally, limited choice or improper selection of type of restoration, there may arise many times favorable conditions for the fracture, complete or incomplete, of the cusp of a tooth. The concern here, of course, is with the incomplete fracture only, which is detectable neither by visual examination nor by roentgen examination.

Symptoms

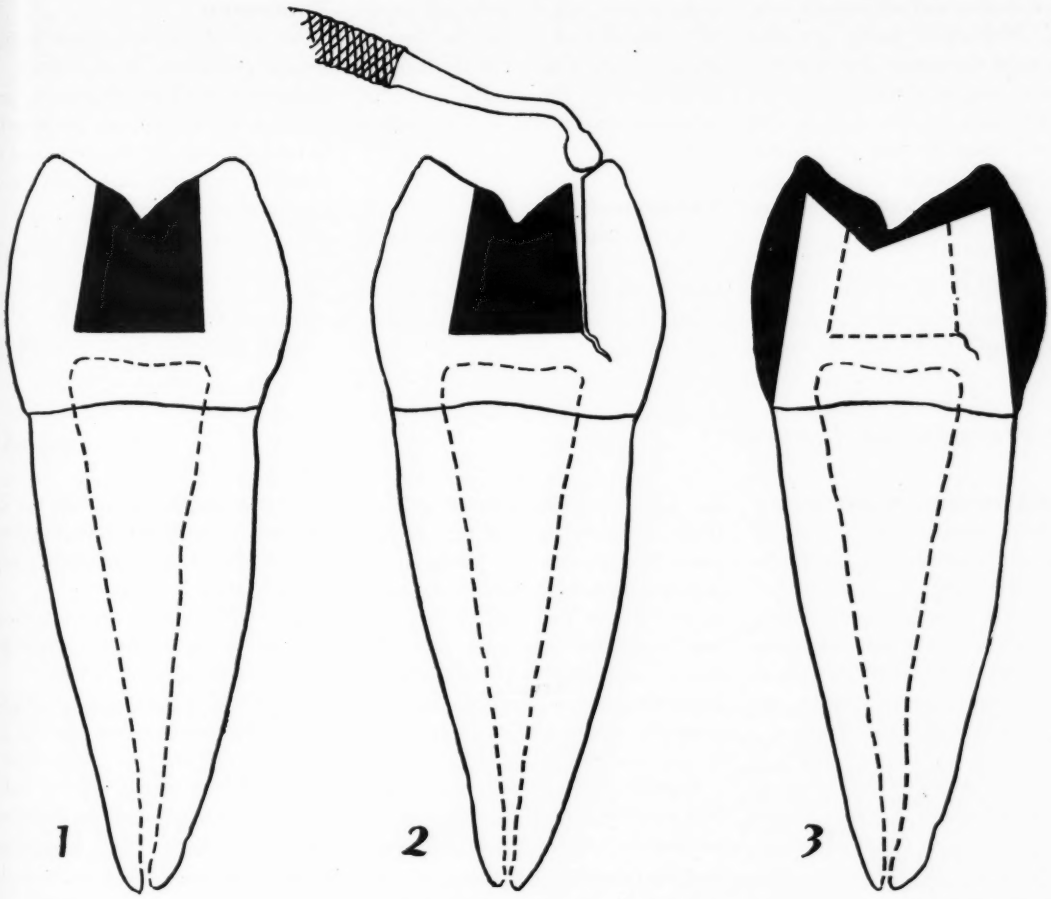
The patient usually presents with the following symptoms: 1. The complaint that he experiences pain during mastication. At all other times he is asymptomatic.

2. He is at times able to localize the pain only in the afflicted side although at other times he is able to indicate correctly whether it is maxillary or mandibular, and even, in some cases, which tooth is giving rise to the pain.

3. Assuming that there is no other pathologic condition present, there are no other symptoms, objective or subjective.

Difficulty in Diagnosis—In trying to establish diagnosis, the following factors are considered: 1. The tooth appears absolutely sound, whether restored or not.

2. The x-ray is perfectly normal. The pulp-tester reveals a vital tooth



1. ***Extensively restored tooth which is to all appearances normal. X-ray examination reveals a well-restored, noncarious tooth.***
2. ***Pressure directed buccally and lingually will disclose the offending cusp by opening the line of fracture (grossly exaggerated) and causing painful dentinal stimulation.***
3. ***Line of fracture permanently closed with a full veneer gold casting.***

without hyperemia. Application of heat elicits no response other than normal, and application of cold reveals no abnormal condition.

3. Sweets or acids do not affect the patient uncomfortably.

4. The occlusion is in perfect balance.

5. The gingiva and mucosa are clear and healthy.

6. Vertical percussion reveals no periapical inflammation.

7. There is no exposed dentin at the amelocemental junction, and no sensitive root surface.

8. The temporomandibular joints are normal.

Severe Pain Present—Despite the normal factors, however, the patient cannot masticate on the afflicted side without experiencing severe pain.

Treatment Based on Clinical Conditions Unsuccessful—The clinical picture described has caused many dentists to dismiss the patient as a neuritic or a neurotic subject, or to institute treatment ranging from placebo to multiple extractions, often to no avail. Pulp stones are detected and believed to be the cause, frequently leading to needless extraction. The occlusion is adjusted but the symptoms persist. Deep restorations are sometimes believed to be the cause of the symptoms and are changed without amelioration of the difficulty. The patient may go through several referals at some expense. This inconclusive situation has been known to continue as long as eighteen months with the patient resigned to unilateral mastication and all its evils.

Etiology

There is an incomplete fracture into the dentin or even the pulp of a tooth. The elasticity of the dentin holds the fragments in such close adaptation that a line of fracture is not discernible by visual or roentgenographic means. However, when a bolus of tough food forces the cusps of a tooth that is fractured apart, the line of fracture opens, and the dentinal fibrils are stimulated.

Differential Diagnosis

This is made by first ruling out obvious pathologic conditions such as caries, pulpitis, infection, hyper-

sensitive dentin, and periodontal conditions. Moderately heavy pressure with a rigid instrument directed *buccally and lingually* will locate the fractured cusp as this spreads the cusps and opens the line of fracture. Vertical percussion, as ordinarily employed, will not always accomplish this.

Prognosis

The fracture may or may not involve the pulp. If it does, the prognosis is poor, for the pulp will surely be contaminated along the line of fracture when it opens. If the fracture terminates in the dentin, remedial measures may be met with gratifying success.

Treatment

This consists in binding the cusps immovably together. This is usually best accomplished with a full cast crown, but in some cases an onlay will suffice.

Summary

An increasing, sometimes baffling, dental condition is described. Its symptoms, etiology, diagnosis, prognosis, and treatment are presented. It is believed that the discussion of this condition will aid materially in the conservation of teeth.

Second Field Hospital
APO 108, *New York.*

The Origin of Cancer

The Endocrine Hypothesis

Many facts seem to link the pathogenesis of some cancers with the steroid hormones:

(1) It has been known for many years that the anatomic structures which these substances affect, such as the breast, uterus, and prostate are predisposed to malignant change.

(2) Certain of the steroid hormones, and particularly the estrogens, have induced cancer in experimental animals.

(3) Cancer of the breast and prostate can be stimulated or retarded by steroid hormone therapy or by removal of the ovaries or testes.

(4) Cancer of the prostate is unknown in eunuchs, and breast cancer is rare in ovariectomized women.

(5) Cancer develops with greatest frequency at the time of life when changes are occurring in the endocrine balances.

(6) There is a close structural relationship between the steroid hormones and many of the chemical substances that will induce cancer in experimental animals. These and similar related facts fall far short, however, of explaining all types of cancer.

Partial Explanation—It has been pointed out that each person has a characteristic pattern of steroid hormone excretion, and consequently, of steroid hormones in the body. During the process of aging, the production and metabolism of these hormones undergo numerous changes. As the balance of the various steroids shifts, it seems possible that certain steroids with greater carcinogenic properties are manufactured in greater quantity in the body. It has also been suggested that some new substance with high cancer-producing properties may be formed, and subsequently released to exert its effect on any susceptible tissue.

Possible Source of Malignancy—It is possible that such a defect in the metabolism of the steroid hormones in some localized tissue area may be responsible for the initiation of a malignancy at that particular site. In view of these possibilities, intensive research on steroid hormone metabolism in relationship to human cancer is being conducted in several cancer research centers.

Nutrition in Relation to Cancer

It has been conclusively demonstrated in experimental animals that under certain circumstances nutritional factors alone can control the appearance and development of malignant neoplasms:

(1) Caloric restriction alone is effective in inhibiting the genesis of all types of tumors in mice. Related to this fact is the observation that caloric restriction results in reduced activity of the endocrine system.

(2) It has also been found that a high level of riboflavin (vitamin B_2) in the liver of rats is a major factor in combating the action of the carcinogen, para-dimethylaminoazebenzene, in its effect in producing hepatomas in these animals.

(3) A chronic choline deficiency is known to be conducive to the production of hepatomas in rats.

Possible Effects of Dietary Imbalance—The observations quoted and other, similar ones, are suggestive of the possibility that a dietary imbalance may produce changes in cellular metabolism that result in carcinogenesis. Indeed, it has even been suggested that cancer may arise from altered nutritional relationships between tissues.

Extraneous Substances in the Diet—(1) Evidence has been presented to show that the feeding of certain food dyes may stimulate the formation of tumors in experimental animals.

(2) Overheated or burned fat is known to have a weak carcinogenic activity.

(3) The action of digestive secretions or of intestinal bacteria upon certain food constituents, and also upon the steroid bile acids, has been suggested as a potential source of gastrointestinal cancer.

All of these considerations require much more experimental data to support their importance in solving the total problem.

Adapted from *Cancer Bulletin* **5**:136 (November-December) 1953.

Direct

ACRYLIC RESIN

Inlays

ROGER K. STOCKTON, D.D.S., Ft. Lauderdale, Florida

DIGEST

With the advent of the new plastic cements it is possible to avoid the pitfalls of the direct acrylic resins, which in practice proved greatly disappointing, and to insert direct plastic inlays. The plastic inlay technique described herein is simple in procedure: several inlays can be inserted and polished within a space of thirty minutes.

Discussion

The direct acrylic resin restoration materials made their first appearance in this country in 1948. In retrospect, it would seem that manufacturers introduced untested products to thousands of dentists throughout the United States.

Material Accepted Enthusiastically—Accompanied by sensational advertising, the new acrylic resin seemed destined to supplant completely the silicate cements. The acrylic resins were accepted enthusiastically and the dental profession, told that simplicity of technique, ease of manipulation, color harmony, and permanent results could be expected from the acrylic resins, believed that silicate cement inadequacies would be eliminated.

Promises Disappointing—It has taken years of continued clinical effort to evaluate direct acrylic resins. The material has gradually fallen into disfavor and there is an increasing tendency to discard the acrylic kits and return to silicate cements. The material may, however, be used to make plastic inlays.

Specific Disadvantages of Acrylic Material

The disadvantages of the acrylic material are the following:

1. The innate inability of the material to adhere to tooth structure.

2. The mass shrinkage during polymerization.

3. The difference in the coefficient of linear expansion and contraction, where the acrylic contracts more than tooth structure when chilled, and expands greater than tooth structure when heated.

Results from Difference in the Coefficient of Linear Expansion—The difference in the coefficient of linear expansion results in capillary attraction of salivary fluids and colloidal food debris between the restoration material and the tooth structure. Recurrent marginal caries and discoloration ensue.

Use of Material Discontinued—Inherent frailties have largely contributed to the failure of direct acrylic resin restoration material and have justified discontinuance of its use by many dentists.

Technique for Insertion of Direct Plastic Inlays

By the use of the new plastic cements it is now possible to avoid the disadvantages of the direct acrylic resins and to insert direct plastic inlays. The technique for direct acrylic resin inlays for Class III and Class V cavities is described in the following steps:

1. The cavity preparation is finished in the same manner as any other inlay preparation (Figs. 1 and 2).

2. The shade of plastic is selected and the mixture is completed on the glass slab to the proper consistency.

3. The plastic mass is transferred to the clean dry palm of the hand and tamped with the edge of a stellite instrument (Fig. 3) to allow further polymerization of the mass. This pro-

cedure results in maximum polymerization outside of the cavity and minimum mass shrinkage when in the cavity.

4. When the material attains a somewhat dry, dough-like consistency, it is ready to insert into the cavity. To allow easy removal of the plastic inlay, the cavity should be painted with a soap solution.

5. A resin strip is used to compress the plastic for Class III cavities (Fig. 4). A Tracy impression tray is used for Class V cavities (Fig. 5). Either means is held in place until the plastic polymerizes.

6. The inlay is removed (Figs. 6 and 7), and the plastic excess is trimmed, being careful not to delete the margins.

7. Undercuts are placed in the cavity, either with wheel burs or the Airdent. This procedure will ensure retention of the inlay because the plastic cements adhere more tenaciously to the plastic than to the tooth structure. The cement will harden in the retentive areas, thereby helping to thwart dislodgement.

8. The cavity and plastic inlay are dried and sterilized with alcohol.

9. The shade of plastic cement is selected and a creamy mix is rapidly transferred to the cavity.

10. The plastic inlay is firmly pressed into place (Figs. 8 and 9).

11. After allowing the cement sufficient time to harden, the inlay and cement excess should be trimmed with a double-edged knife (Fig. 10) finishing burs, and sandpaper discs.

Final Procedure—The final polish is obtained with flour of pumice or tin oxide using a rubber cup (Figs. 11 and 12).

Advantages of Technique

The technique described produces a restoration which fulfills all the requisites of an anterior restoration material. Esthetics, hermetically sealed margins which will resist recurrent caries, and durability are a few of the many desirable characteristics of the technique. Through the use of this technique many of the plastic kits will be taken off the shelf and put to good use as intended five years ago.

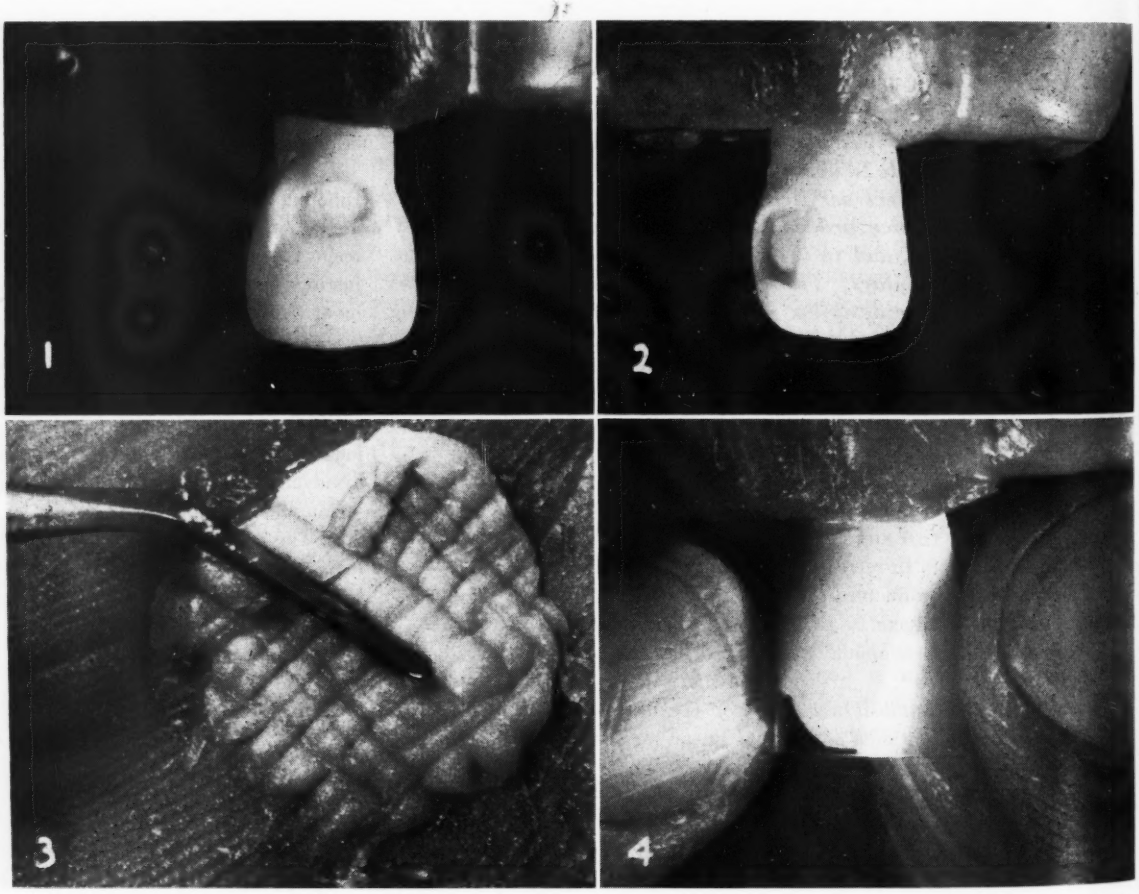
Summary

1. Direct acrylic resins have not been completely successful.

2. Plastic inlays nullify inadequacies of the direct pressure technique.

3. Plastic inlays may be completed in thirty minutes.

1020 *East Broward Boulevard.*

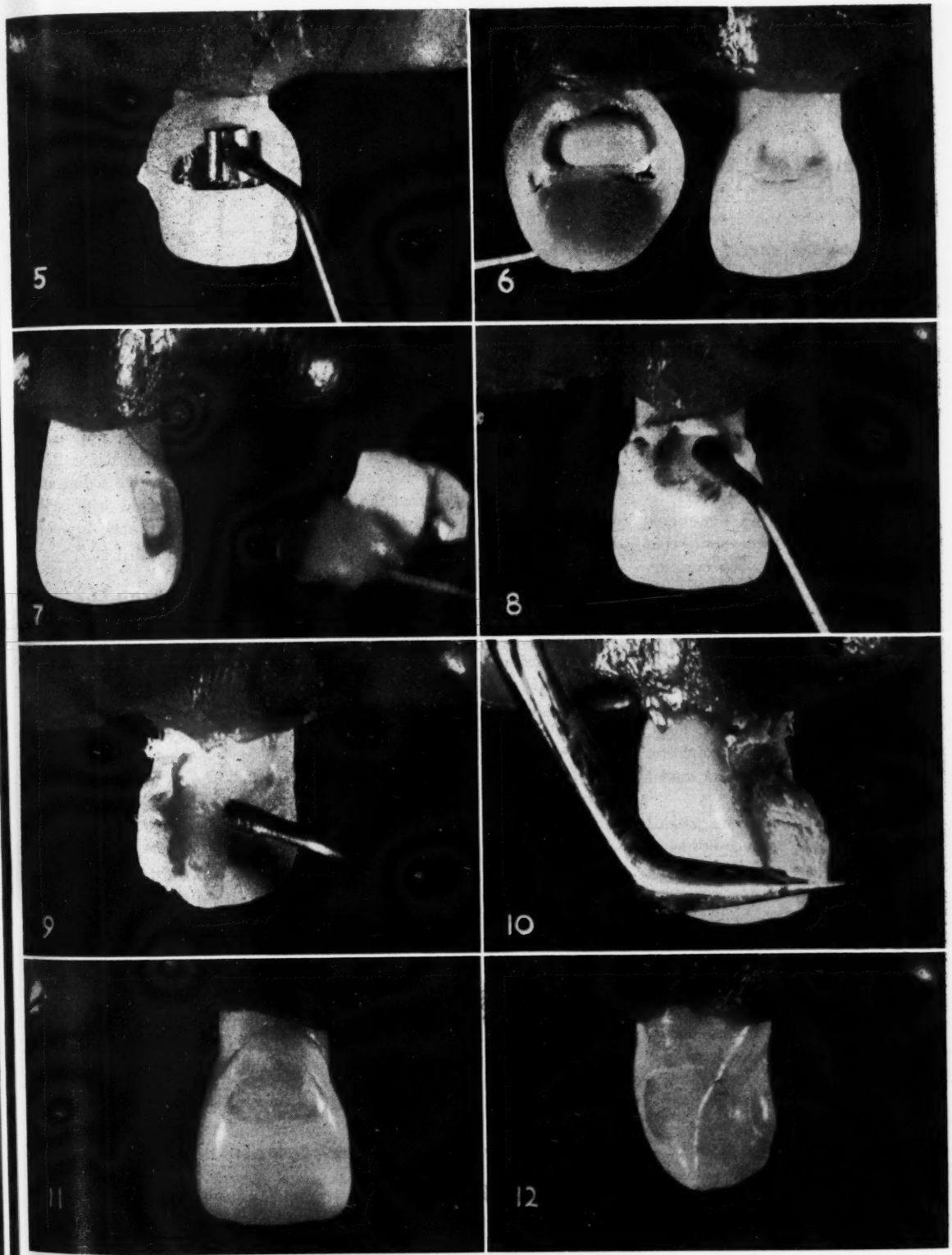


1. ***Class 5 cavity preparation.***

2. ***Class 3 cavity preparation.***

3. ***Tamping mass of plastic to facilitate homogeneous polymerization.***

4. ***Resin strip compressing plastic.***



5. *A Tracy tray is used for Class 5 cavities.*
6. *Plastic inlay removed from Class 5 cavity.*
7. *Plastic inlay removed from Class 3 cavity.*
8. *Inlay cemented with plastic cement.*
9. *Inlay cemented with plastic cement.*
10. *Excess cement trimmed with author's double-edged plastic instrument.*
11. *Plastic inlay cemented and polished.*
12. *Plastic inlay cemented and polished.*

BODY CHEMISTRY

in Health and Disease—Part Eight

MELVIN E. PAGE, D.D.S.

and D. L. BROOKS, A.B., St. Petersburg, Florida

DIGEST

Two case histories are presented which demonstrate the interrelationship of causes of degenerative disease of the oral cavity and the body in general with concurrent response to the systemic approach.

Case Report One

The patient in this case was a woman of 47 with a 15-year history of arthritis affecting her spine, neck, head, and jaws. An oral examination showed extensive but excellent dental restoration.

Present Condition—The patient was virtually unable to turn her head or carry it fully erect. Speech was somewhat difficult because of pain and stiffness in the jaw. Walking was slow and measured.

Medical History Extensive—1. Dental caries in this patient dated back to childhood.

2. Periods of diarrhea and spastic colitis with nausea had been recurrent for twenty years.

3. Arthritis had been diagnosed as of at least 15 years' duration.

4. A hysterectomy had been performed several years earlier, a bone fusion in the lumbar region had been performed, and three months prior to examination surgery had been instituted for a misplaced kidney.

5. A hemorrhoidectomy had also been performed.

6. Since the hysterectomy hot flashes had been troublesome, and for the past year fatigue produced a persistent headshake.

This patient had received the best of care and the best available in diagnosis and treatment. Nevertheless, she was deteriorating physically.

Graphed Measurements

The anthropometric measurements gave the following pattern on both sides: Gynic starting point, markedly hypothyroid and hypoposterior pituitary, with a slightly hypoanterior pituitary. There was swelling of the right knee due to arthritis or a leg injury following a streptococcus infection.

Past Treatment—The dietary history included a large amount of sweets, and treatment included estrogenic injections following the hysterectomy. The estrogen had been discontinued prior to arrival for examination. Despite the endocrine pattern, the history of colitis and the presence of acute pain made it probable that the phosphorus blood level would be high. Also, the pain may have contributed to the high blood pressure of 150-90.

First Blood Test—Whether due to an error in technique or to the patient's condition is not known, but the first blood sample coagulated before analysis could be made. The second blood sample taken three days after the start of a corrective diet, gave a perfect blood sugar of 100, calcium 9.4, phosphorus 4. This degree of excess phosphorus was serious. The patient was having an attack of diarrhea at the time. The blood count and differential were satisfactory except for the high sedimentation rate of 23. A high sedimentation rate is usually noted with arthritis although its significance is not fully understood.

Treatment Established

In order to achieve as much as possible as quickly as possible, our staff physician suggested that osteopathic treatments be started concurrently with correction of body chemistry. The endocrine of choice for the start of biochemical treatment was 1/100 milligram of testosterone as dictated by the gynic starting point of the graph.

Initial Results—The blood analysis showed a drop in blood sugar to 95, a more satisfactory calcium-phosphorus balance, 10.8 to 4; and improvement in the sedimentation rate which was now 12. Hemoglobin and cell volume were satisfactory, but the blood pH 7.5 was slightly high. The specific gravity readings fluctuated from normal to subnormal. The patient's knee was less swollen, but hot flashes and a state of depression were unpleasant. Blood pressure had dropped to 122/88.

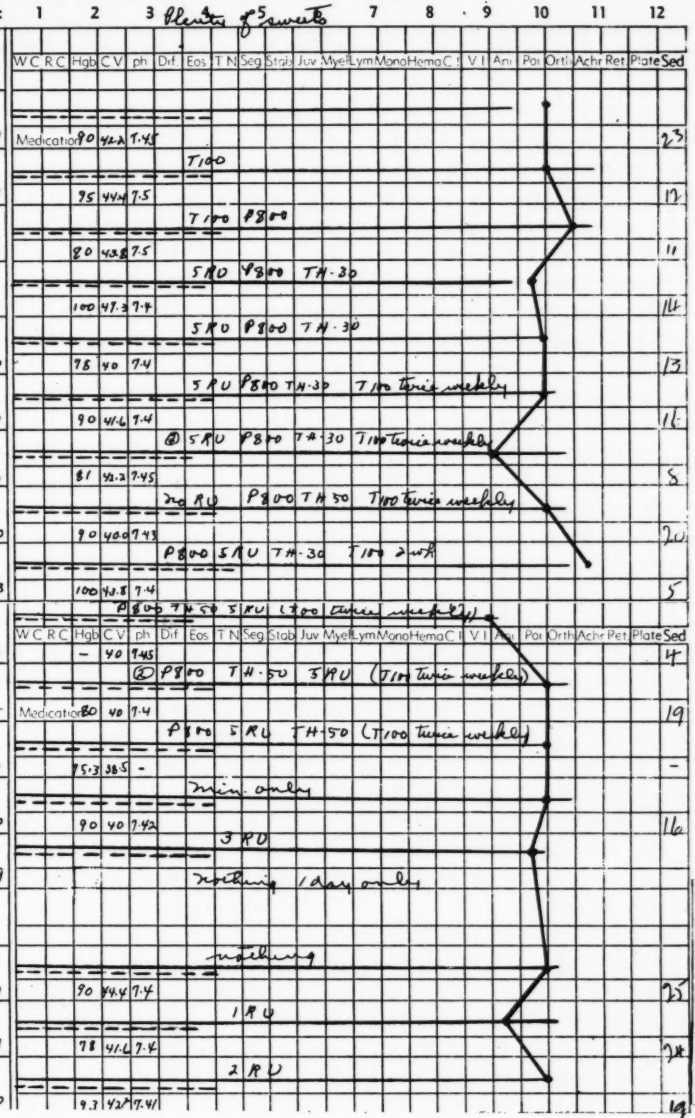
Endocrine Correction Continued—With the addition of 1/800 grain of posterior pituitary substance daily the resulting blood analysis was excellent: blood sugar was 100, calcium 10.8, and phosphorus 4.2, with a sedimentation rate of 11.

Modification of Treatment—Experience indicated, however, that con-

BIOCHEMICAL INDEX

BLACK LINE REPRESENTS PHOSPHORUS LEVEL — RED LINE CALCIUM LEVEL

	DATE	B.S.	B.P.	U.S.G.	CA.	P:
1st Blood	2/6/51					
2nd - In absence of sugar	2/9/51	100			9.4	4.0
3	2/15/51	93			10.8	4.0
4	2/20/51	100			10.8	4.2
5	2/26/51	95			9.4	3.9
6	2/28/51	100			10.0	4.0
7	3/3/51	100			10.2	4.0
8	3/12/51	91			10.4	3.6
9	3/15/51	100			10.4	4.0
10	7/3/51	105			10.4	4.3
1st Blood	7/9/51	98			9.2	3.6
2nd - In absence of sugar	7/18/51	100			10.4	4.
3	8/22/52	89			10.0	4.0
4	9/9/52	95			10.4	4.0
5	9/13/52	93			9.8	3.9
6	9/15/52	105				
7	9/17/52	91			10.2	4.0
8	9/22/52	105			10.2	3.7
9	9/27/52	100			10	4.0


1 2 3 7 8 9 10 11 12
Plenty of sweets
W C R C Hgb C V ph Dif Eos T N Seg Stab Juv Myel Lym Mono Hema C I V I Ani Pol Orth Achr Ret Plate Sed
Medication
T100
P800
TH-30
5 RU
TH-50
3 RU
1 RU
2 RU
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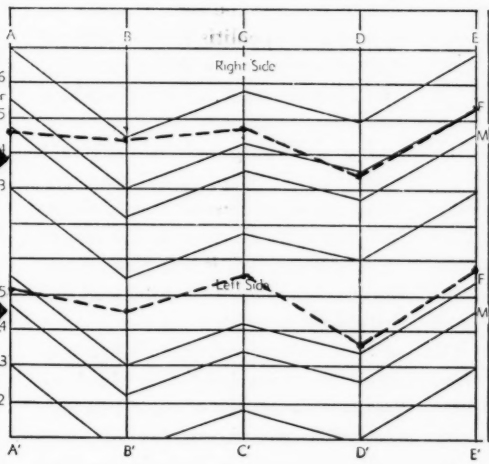
Length right forearm	Quotients	Length right leg	
10.3	1.575	16.2	
Wrist 6.35	A 1.472	9.35	Ankle
one-fourth 6.7	B 1.449	9.7	one-fourth
one-half 8.7	C 1.481	12.9	one-half
three-fourths 9.5	D 1.350	12.85	three-fourths
Elbow 9.9	E 1.530	15.15	Knee

Circumferential Measurements



Left forearm	Quotients	Length Left leg	
9.8	1.650	16.2	
Wrist 6.3	A' 1.510	9.5	Ankle
one-fourth 6.6	B' 1.462	9.65	one-fourth
one-half 8.15	C' 1.559	12.7	one-half
three-fourths 9.3	D' 1.365	12.7	three-fourths
Elbow 9.5	E' 1.579	15.	Knee

tinuance of this balance could not be expected if the remainder of the endocrine pattern was not corrected as well. Furthermore, the patient was depressed, homesick, and nervous on the date of this blood test. As a check, therefore, the 1/100 milligram of testosterone was discontinued and 5 rat units of estrogen were substituted, while the 1/800 grain of posterior pituitary extract was continued.

(Too much testosterone may produce nervousness and despite the graph, the hysterectomy could well produce a situation requiring estrogen.)

Reaction Unfavorable — Following the modified treatment the patient had a severe headache and her first attack of nausea in six months. The osteopath believed that his treatment might account for this reaction. Without another blood test 1/30 grain of thyroid was added to the daily 5 rat units of estrogen and P-800.

Test Repeated—This blood analysis was not satisfactory for the blood sugar dropped to 95, and the phosphorus of 3.9 was too high for the calcium of 9.4. It was decided to repeat the blood test on this combination, for although osteopathic treatments had been temporarily discontinued, the stiffness in the neck had been suddenly reduced.

Subsequent Blood Test Satisfactory —Blood sugar was 100, calcium 10, phosphorus 4. With such a perfect calcium-phosphorus balance, however, it would be easy for the patient to fall into the high phosphorus phase with acute pain. A physiologic dose of 1/100 milligram of testosterone, one tablet twice weekly, was therefore added to the daily tablets of 5 rat units of estrogen, P-800, and TH-30. This combination resulted in an excess of calcium: blood sugar 100, calcium 10.2, phosphorus 4.

Combination of Endocrine Substances—The estrogen was doubled (two tablets of 5 rat units of estrogen daily) with continuance of 1/800 grain posterior pituitary substance and thyroid extract daily, plus 1/100 milligram testosterone twice weekly.

Effect of Combination—The excess calcium increased under this combination of endocrine substances: Calcium 10.4, phosphorus 3.6; blood sugar dropped to 91. The extra amount of estrogen had no influence upon the frequency or severity of the hot flashes and the blood test definitely indicated that estrogen was not required.

Future Dosage Estimated—Since the patient could remain away from home only a few more days, it was decided to test a blood specimen in the absence of all estrogen for three days. From the results of this test the best dosage to be used after her departure could be estimated. A blood analysis showing the effect of 1/800 grain posterior pituitary, 1/30 grain thyroid daily, plus 1/100 milligram testosterone twice weekly produced a satisfactory balance: blood sugar 100, calcium 10.4, phosphorus 4. It was therefore estimated on the basis of previous tests on the 5 rat units of estrogen, plus the carried-over effect from double this dose, followed by three days with none, that 5 rat units of estrogen should be adequate until the patient could be seen again.

Recommended Dosage — It was therefore recommended that 5 rat units of estrogen, P-800, and TH-30 be taken daily, plus T-100 twice weekly, with a strict diet at all times. Mineral tablets, of course, were to be continued indefinitely.

Progress of Case

Four months later the patient returned for a re-evaluation of her case. The results of blood analysis at this time were the following: blood sugar 105, calcium 10.4, phosphorus 4.3. The phosphorus and blood sugar indicated that the 1/30 grain of thyroid extract had been continued too long. The patient's need for this endocrine was being overcome.

Thyroid Dosage Reduced—Thyroid tends to raise the phosphorus and blood sugar levels and should therefore be used with care; its use should be checked with frequent blood tests. Dosage was reduced to 1/50 grain of thyroid extract with daily continuance of 5 rat units of estrogen, P-800, and the T-100 twice daily. The blood results on this was blood sugar 100, calcium 10.4, phosphorus 4.

Blood Analysis a Year Later—The patient was not seen again for one year. At this time a blood analysis was not wholly satisfactory: blood sugar 89, calcium 10, phosphorus 4. It was believed that the patient had progressed to the point where the only endocrine supplement needed should be estrogen. A blood test on minerals and corrected diet only was taken: blood sugar, 95, calcium 10.4, phosphorus 4.

Estrogenic Tablets Given — The blood sugar level (95) had improved, and the calcium-phosphorus ratio (10.4 to 4) gave a safe margin of .25 milligram excess calcium. Estrogenic tablets varying in strength from 1 to 3 rat units were tested. The 2-rat unit strength proved most satisfactory.

Importance of Diet—This patient had always observed the diet strictly. It was estimated that with continuance of the estrogen and the minerals, in addition to the strict diet, further progress would be realized.

Comment

It was realized by the patient and those concerned with the case that the effects of such an extensive and long-continued battle with arthritis could never be wholly eliminated. The following comment would seem to be especially applicable to the endocrine imbalances described in this case:[1]

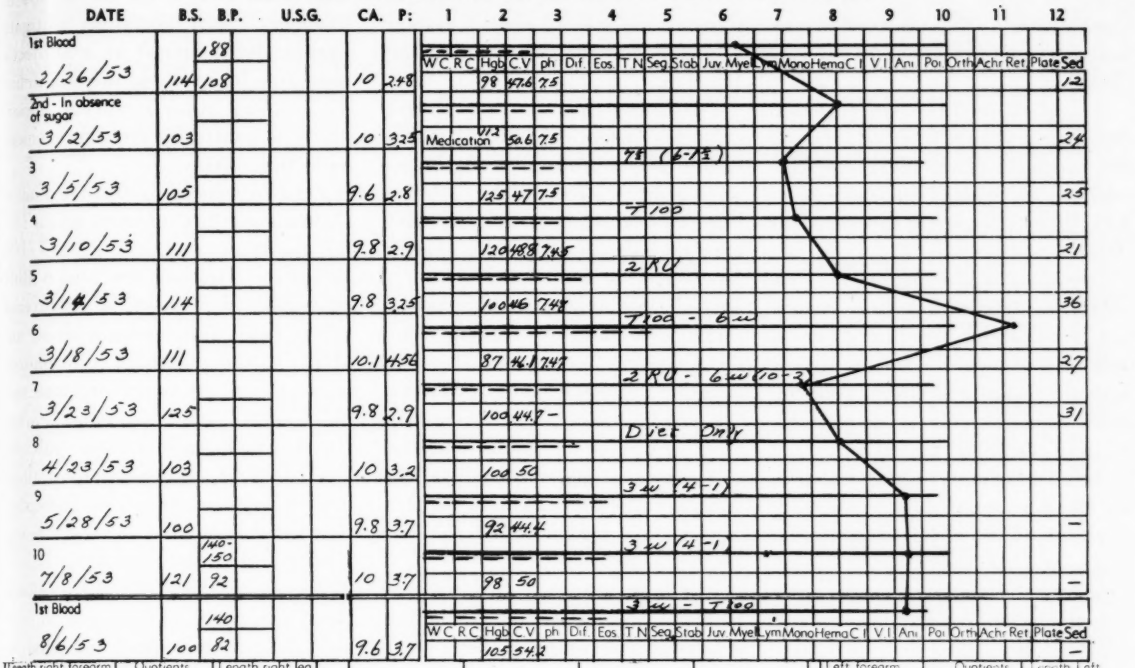
"The secretions of the endocrine glands act as harmonizing influences to bring about balanced coordination between the two divisions of the autonomic nervous system. Endocrine imbalances, therefore, can cause functional disturbances in the vegetative system and disordered autonomic physiology likewise gives rise to endocrine disequilibrium as an example of this reciprocal effect, thyroid secretion, or thyroxin, stimulates the suprarenals to secrete epinephrine which activates the sympathetic system. The suprarenals cooperate with the sympathetic in every way so that the injection of epinephrine imitates the effect of stimulating the sympathetic nerves. The secretion of epinephrine and thyroxin is not only excited through the sympathetic, but in turn,

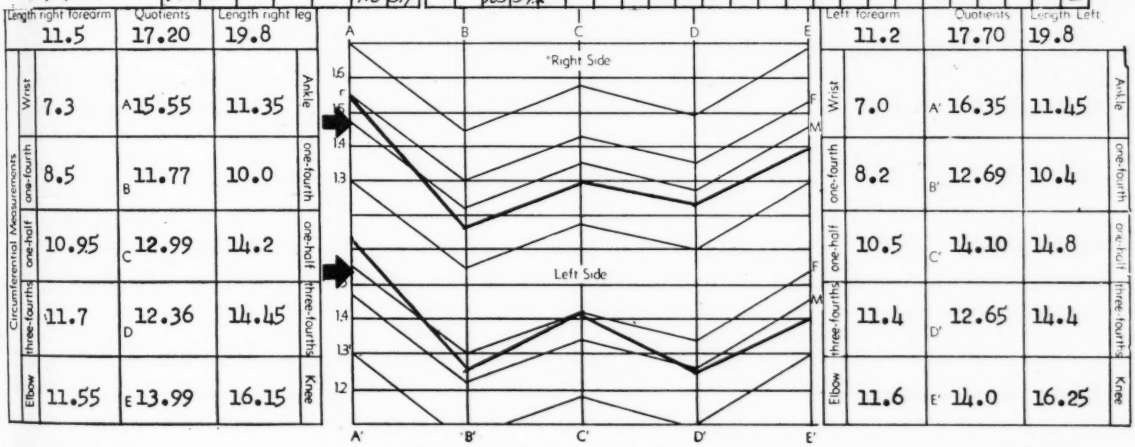
[1]Wallerstein, Otto R.: Endocrine Diarrhea. Western J. Surg. Obst. & Gynec. **51**:143-145 (April) 1943.

54

BIOCHEMICAL INDEX

BLACK LINE REPRESENTS PHOSPHORUS LEVEL — RED LINE CALCIUM LEVEL




Length right forearm 11.5
Quotients 17.20
Length right leg 19.8
Wrist 7.3 A 15.55 11.35 Ankle
one-fourth 8.5 B 11.77 10.0 one-fourth
one-half 10.95 C 12.99 14.2 one-half
three-fourths 11.7 D 12.36 14.45 three-fourths
Elbow 11.55 E 13.99 16.15 Knee
Circumferential Measurements
Right Side
Left Side
Left forearm 11.2
Quotients 17.70
Length Left 19.8
Wrist 7.0 A' 16.35 11.45 Ankle
one-fourth 8.2 B' 12.69 10.4 one-fourth
one-half 10.5 C' 14.10 14.8 one-half
three-fourths 11.4 D' 12.65 14.4 three-fourths
Elbow 11.6 E' 14.0 16.25 Knee

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increases the response of other structures to such stimulation."

Case Report Two

Another case which will illustrate the interrelationship between oral and general health problems is that of a 55-year-old man. In this case an inefficient body chemistry was the source of a poor oral history and hypertension.

Present Condition — The patient was edentulous with a tendency to ridge absorption. His hair was abundant but completely white. Gynic men usually retain their hair much later than andric men. This fact gave a clue to the expected endocrine pattern even prior to the measurement test.

Endocrine Pattern—The graphed measurements showed a gynic starting point, more marked on the left than on the right. The question was: did the hyperthyroid and hyperanterior pituitary functions affect the starting point?

Dietary Tendencies—The patient was obviously a man who enjoyed food; for instance, he mentioned a fondness for beer. His hypertension, 188/108 when first seen, had existed for some years and had proved resistant to drug therapy. The patient had been referred by his employer; his experience and ability were too valuable to be lost at the prime of life.

Results of First Blood Test—Analysis of the first blood specimen gave a blood sugar of 114, calcium 10, and phosphorus 2.48; hemoglobin 98, and sedimentation rate 6. Cell volume, 47.6, was fair, blood pH, 7.5, was unsatisfactory. Since 2.48 of phosphorus could combine with only 6.2 of calcium, the compound level

was extremely low. Almost 4 milligrams of excess calcium was highly unsatisfactory. This patient's body was functioning at about 60 per cent efficiency.

Second Blood Test—On corrected diet alone a second blood test showed improvement: blood sugar was 103, calcium 10, with a phosphorus of 3.25. Blood pressure at this time was 190/100.

Considerations in Treatment—Procedure for treatment had to include consideration for the limitations of time. It was necessary for the patient to return to business within a month. Blood samples could be shipped for analysis after his return home but because of the complicating factor of his blood pressure, it was necessary to correlate the effect of endocrine treatment, not only with calcium-phosphorus blood levels, but also with blood pressure readings while he could be seen daily.

Endocrine Treatment Established

The first endocrine supplement was 7.5 units of a combination of 6 parts of protamine zinc insulin, 40 unit strength with 1.5 parts of suprarenal cortex liquid (a weak solution) once daily.

Reason for Combination of Agents—The rationale for the combination of insulin and suprarenal cortex liquid is of interest: insulin was chosen for the purpose of inhibiting both the overactive thyroid and the overactive anterior pituitary. Since the measurement test indicated that both glands were quite markedly overactive, dosage was set at a higher level than usual. The suparenal cortex liquid was added for a dual purpose: (1) it would serve (as demonstrated on numerous cases) to inhibit the overactive posterior pituitary. (2) If correctly estimated, it would prevent the insulin from dropping the blood sugar level below 100.

Effects of the Substances—Experience has shown that in cases where insulin reduces blood sugar, suprarenal cortex liquid raises it. Where the two substances are required, proportions can be estimated on a basis of the patient's initial blood sugar reading plus the degree of hyperactivity of the thyroid and/or anterior pituitary, plus the posterior pituitary function.

Proportion Approximately Correct—In this instance the proportions of insulin and suprarenal cortex chosen were nearly correct as shown by resulting blood sugar of 105. The effect upon the calcium-phosphorus balance, however, was not all that could be desired: the blood pressure was fluctuating, the *average* reading being neither better nor worse. The daily injection of a small amount of insulin, 7.5 units of "6 to 1.5", was continued and, because of the graph indication of gynicity, 1/100 milligram of testosterone was added. The blood pressure average for the next three days showed a slight drop.

Insulin Discontinued—The decrease in blood pressure permitted the discontinuance of insulin so that a blood test on the 1/100 milligram of testosterone could be obtained. After three days on this alone a blood test showed a blood sugar of 111, calcium 9.8, phosphorus 2.9. The only real change was the rise in the blood sugar. The blood pressure was holding; testosterone was therefore discontinued and 2 rat units of estrogen were given daily. It was deemed necessary to check this while the patient was available in view of the possible question concerning graph indications of andric-gynic balance.

Blood Pressure Unchanged—A blood test four days later showed a drop in the amount of excess calcium, but an increase in the blood sugar: 114—9.8—3.25. The blood pressure showed no marked change in either direction. The situation was somewhat puzzling, but (1) a steady increase from 6 to 18 in the sedimentation rate, (2) some fluctuation in the white count, and (3) the fact that the patient's wife was in bed with a virus infection, suggested the possibility of presence of a minor infection and thus complete information concerning treatment was not being obtained from the blood analysis.

Added Variable Possible—It was possible that an infection was introducing another variable to the situation in addition to the alterations in treatment. Such situations militate against quick arrival at a subject's endocrine formula and prove a definite handicap when treatment opportunity is limited by the time element as in this instance.

Tests Influenced by Outside Factor—Reasoning that infection was a factor, the patient was again given 1/100 milligram of testosterone, plus 6 units of insulin, but without the suprarenal cortex fluid. The resulting blood analysis showing a high phosphorus level as opposed to the previous test on insulin plus suprarenal cortex liquid which gave a high calcium level; while 1/100 testosterone alone gave a high calcium level indicated that blood tests were definitely being influenced by some extraneous factor.

Results of Blood Tests Correlated—All that could be done was to continue to collect as much information as possible from correlating various blood tests on similar treatment and complete the treatment after the patient's return home. An estrogen tablet of 2 rat units' strength was given in conjunction with 6 units of 10 parts of insulin to 2 parts of adrenal cortex liquid. The resulting blood test was unsatisfactory in every way: blood sugar was 125, calcium 9.8, phosphorus 2.9.

Progress of Case

Treatment under close observation was terminated. The patient was now obliged to return home. Blood tests did not show progress, blood pressure was neither worse nor better. The situation was explained to the patient who was advised to observe the corrected diet rigidly and to send a blood specimen at the end of the month.

Improvement Shown on Corrected Diet—One month later on diet alone the blood analysis showed improvement over the original test both in blood sugar and calcium-phosphorus ratios. The blood sugar was 103, calcium 10, phosphorus 3.2. This left 2 milligrams of excess calcium as compared to the original 4 milligrams of excess calcium. The blood differential and white count were satisfactory.

The blood pressure had dropped to 152/94. All of this improvement was on diet alone.

Body Function and Diet—The osteopathic profession, as well as the dental and medical profession, recognizes the value of diet in the treatment of disease: "Diet holds an important place in complete therapy. Body function can vary with the nutritive value of the diet which in turn is determined by interrelation of substances present in the diet. Investigation of the literature touching on this subject reveals some significant conclusions . . ."[2]

Endocrine Treatment Reinstated—In search of further progress, endocrine treatment was reinstituted: a daily injection of 3 units composed of 4 parts of 40-unit protamine zinc insulin to 1 part of suprarenal cortex liquid (in weak solution) was recommended. The insulin would serve to inhibit both the overactive thyroid and anterior pituitary; the suprarenal cortex liquid would inhibit the posterior pituitary function. It was estimated that the proportions of this combination would lower the blood sugar slightly.

Comment — A combination of 3 units of 3 parts to 1 is ordinarily found capable of maintaining a blood sugar level. Increasing the proportion of the insulin will decrease the blood sugar; increasing the proportion of suprarenal cortex liquid will raise it.

Progress Demonstrated—A blood test one month later showed further progress: blood sugar was 100, calcium 9.8, phosphorus 3.7. Blood pressure at this time was 140/80.

Later Analysis—Two months later a blood analysis showed a rise in blood sugar to 121, calcium 10, phosphorus 3.7, and an increase in blood pressure to 140-50/92. On questioning, the patient admitted eating a small amount of cake.

Testosterone Indicated — In the meantime is was found that the blood level of the patient's wife responded well to estrogen, so that testosterone was indicated for her marital partner. His injection was changed to 3 units of insulin alone, as T-100 in itself should aid in stabilizing the blood sugar level.

General Improvement Noted — A month later the blood pressure had dropped from the original 188/108 to 140/82 and was holding at this point so long as the patient was scrupulous in observing diet. Weight had decreased 33 pounds in six months. Blood sugar was 100, calcium 9.6, phosphorus 3.7. The patient "felt fine." Conditions were optimum for cessation of dental ridge absorption.

Discussion

The two cases reported have been described in detail in order to demonstrate the common underlying causes for degenerative disease of the oral cavity and the body in general. These two cases demonstrate concurrent response of degenerative symptoms in the mouth and the body in general under the same systemic treatment. The systemic approach consisted of dietary correction and endocrine supplementation.

Significance of Metabolism and Nutrition — Concerning dietary importance, Spies[3] states: "It is clear that many persons have placed too narrow a significance on the importance of nutrition and metabolism in the general physiological process. Patients must have an adequate intake of the needed nutrients, which must be properly assimilated and utilized, if the physician is to be expected to take the best care of them."

Oral Degeneration an Alarm Signal —Dental caries is so common (95 per cent of *school children* have it) that little heed is given caries, whereas it should serve as an alarm signal. It is the most readily detected degenerative process. Since the oral cavity is nourished by the same blood supply as the body in general, degeneration within the mouth should be prima-facie evidence that all is not well within the organism as a whole.

(*End of part eight*)

2810 *First Street North.*

[2]Scheurer, George; Wendling, Frank; Brandeberry, Kent; Maveal, Ervin; and Paterson, Katherine: Summary statement of "Advances in Nutrition," J. Osteo, p. 14 (February) 1953.

[3]Spies, Tom D.: JAMA **153**:185-193 (Sept. 19) 1953.

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SODIUM FLUORIDE

in the Drinking Water of Mice

ALFRED TAYLOR, Ph.D., Austin, Texas*

DIGEST

In the course of screening various compounds for possible anticancer properties, sodium fluoridated drinking water was tested for its effect on the mammary cancer incidence of a high cancer strain of mice. Preliminary results seemed to indiate that animals drinking the fluoridated water had a shorter life span as compared with animals drinking the nontreated water. There was no indication that the incidence of cancer was changed. Since no record was found in the literature of any experiments in which animals had been maintained on sodium fluoridated water for most of their life span, it was considered that these results should be checked by further trials. A series of experiments have now been completed involving a total of 645 mice.

Methods Employed in Study

The age, strain, and number of the female mice involved in each experiment are recorded in the tables (Figs. 1 and 2). High cancer strain C_3H and low cancer strain dba female mice were used in the tests. The mice in the first group of seven experiments, including 281 animals, were maintained on a Purina chow diet.

Fluorine Element Present—Later it was discovered that this food contained 20-38 ppm of fluorine due to a high level of this element in the bone meal supplement. The form in which this fluorine is present and the extent of its availability is unknown.

Difference in Toxicity Reported—Dillon[1],[2] has reported that there is a difference in toxicity of various fluoride compounds and that bone serves to detoxify soluble fluorides such as sodium fluoride.

Mixed Grain Diet Fed Second Group—The second group of experiments included 364 mice fed a mixed grain diet containing a negligible fraction of fluorine.

Environment Controlled—The mice were divided into equivalent litter mate groups and were kept in lattice bottom steel cages which were suspended on racks. The animal room was air-conditioned with a temperature of 80° Fahrenheit.

One Variable Present—Experimental and control animals as far as possible received the same treatment even to rack position of the cages, so that the one variable was the difference in the drinking water.

Distilled Water Used—In most of the experiments, the experimental groups received distilled water containing 1 ppm fluorine in the form of sodium fluoride. A few trials were run with other concentrations. The controls drank distilled water.

Results

The results of the experiments are shown in Tables 1 and 2. It will be noted that the life span of the mice drinking the sodium fluoridated water averaged 9-10 per cent less than that of the controls, for the period of the experiment. This effect seemed to be general, irrespective of diet, strain or age of the animals. Also, there was no significant difference between the 1 and 10 ppm fluoride groups.

Statistical Difference in Mean Life Span—The difference between the mean life spans of the experimental and control animals was 0.91 months and the standard error of the difference is 0.16. The statistical significance of the difference is therefore 5.7 where more than 2.0 is considered valid.

Precentage of Mice Dying—In the last column of each table is recorded the percentage of mice dying during the course of each experiment. Inspection of these figures reveals that in 15 of the 16 trials with mice on the treated water, there were more deaths in the fluoridated water groups as compared with the controls drinking distilled water. A total of 71 per cent of the control mice died during the course of the experiments as compared with 83 per cent of those on sodium fluoridated water.

Nontumor Diseases—The types of nontumor disease appeared to be about the same for experimental and control animals except that four mice on the fluoridated water developed calculi ranging in size from 71 to 148 milligrams in the urinary bladder.

Deaths Due to Tumors—The percentage of deaths due to tumors was 54 per cent in the control and 59 per cent in the experimental groups. The four groups of mice receiving 10 ppm of fluoride averaged 63 per cent deaths from cancer in comparison with 50 per cent for the corresponding controls. All the tumors which de-

*From the Biochemical Institute, University of Texas, and the Clayton Foundation for Research, Austin, Texas.

[1]Dillon, Charles: Dental Practitioner **3**:79-86, 1952.

[2]Dillon, Charles: Ibid. 101-104, 1952.

TABLE I. Sodium Fluoride in the Drinking Water of Mice on a Purina Diet, 7 Experiments.

	No. of mice	Strain of mice	Avg. age (mo.)	Fluoride conc. (ppm)	Duration of exp. (mo.)	Avg. life span (mo.)	Avg. life span, control=100	Deaths, period of exp. (%)
C*	21	C_3H	4	0	12	9.1	100	76
E	20	"	4	0.4	12	8.2	90.1	90
C	13	"	6	0	8	7.9	100	38
E	13	"	6	4	8	6.7	84.8	69
C	26	dba	12	0	9	5.4	100	77
E	26	"	12	1	9	4.3	79.6	88
C	19	"	10	0	7	4.8	100	69
E	20	"	10	1	7	3.6	75.0	85
C	19	C_3H	9	0	8	4.4	100	84
E	18	"	9	1	8	5.4	122.7	89
C	18	"	9	0	8	5.6	100	78
E	19	"	9	1	8	4.7	83.9	95
C	25	"	8	0	11	6.3	100	76
E	24	"	8	1	11	5.9	93.7	87
					Avg. C	6.2	100	71
					Avg. E	5.5	90	86

C = control, E = experimental

TABLE II. Sodium Fluoride in the Drinking Water of Mice on a Purina Diet, 5 Experiments.

	No. of mice	Strain of mice	Avg. age (mo.)	Fluoride conc. (ppm)	Duration of exp. (mo.)	Avg. life span (mo.)	Avg. life span, control=100	Deaths, period of exp. (%)
C*	24	C_3H	3	0	15	11.0	100	71
E	24	"	3	1	15	9.2	83.6	96
E	24	"	3	10	15	11.3	102.7	79
C	24	dba	2	0	17	15.1	100	54
E	24	"	2	1	17	14.0	92.7	67
E	24	"	2	10	17	13.9	92.1	62
C	42	"	9	0	10	7.4	100	75
E	42	"	9	1	10	6.7	90.5	78
E	42	"	9	10	10	6.8	91.9	86
C	12	C_3H	3	0	15	11.2	100	80
E	12	"	3	1	15	10.5	93.8	92
E	12	"	3	10	15	9.7	86.6	100
C	28	"	3	0	15	10.6	100	72
E	29	"	3	1	15	9.0	84.9	72
					Avg. C	11.1	100	71
					Avg. E	10.1	91	81

C = control, E = experimental

veloped, in both control and experimental groups, were mammary adenocarcinomas.

Difference in Life Span—The average life span for all the mice dying of cancer was 8.6 for the control and 7.8 months for the experimental mice or a difference of about 9 per cent.

New Groups Formed from Surviving Animals—The death rates based on the percentage of the surviving animals for each month adds validity to the results. At the beginning of each month, the control and experimental animals remaining constituted a new group and the death rate for the month for each experiment was calculated in relation to that number.

Effect of Separate Trial—In the total of 12 experiments, including 16 groups on the fluoridated water, each

month constituted, in effect, a separate trial. Altogether there were 132 such monthly records when deaths occurred in one or both of the control and experimental groups of mice.

Percentage Death Rate—The percentage death rate was the same for control and experimental groups in five of the months, was higher in the controls in 39 months, and higher in the mice on the fluoridated water in 88 months.

Discussion

It has been generally agreed that the continuous ingestion of water containing one or a few parts per million of fluoride has no adverse effects on mammalian organisms aside from some instances of mottled teeth. This assumption is based mainly on studies of human populations utilizing naturally fluoridated drinking water. The present study is obviously restricted in its scope since it deals with a particular species of animal and a specific fluoride compound dissolved in distilled water. It may be that the mouse is especially sensitive to the compound used and the results obtained may not apply to other animal types.

A Glycolytic Inhibitor—Sodium fluoride is well known for its capacity to act as a glycolytic inhibitor. In a recent study in this laboratory[3] it was noted that concentrations as low as 2 ppm of fluoride slightly inhibited the glucose uptake of *in vitro* preparations of chick embryo cells, and lowered mouse tumor cell activity in this respect by more than 30 per cent as compared with the controls.

Adverse Effects Possible—While these results were obtained with *in vitro* preparations, it does indicate that even extremely low concentrations in the drinking water could adversely affect a sensitive animal when imbibed for most of the life span.

Report on Blood Fluoride Concentration—The possibility of adverse effects is emphasized by the report of Smith *et al.*[4] that the blood fluoride concentration is a function of the fluoride concentration of the drinking water. The level of blood fluoride for the residents of a city where the water contains 1.0-1.2 ppm fluoride averaged 0.04 ppm, while the blood fluoride level of the residents of a city where the water contains 0.06 ppm fluoride averaged 0.014 ppm.

[3]Young, M. K., and Taylor, A.: Univ. of Texas Publication No. 5314, 80-98, 1953.
[4]Smith, F. A.; Gardner, D. E.; and Hodge, H. C.: J. Dent. Research **29**:596 (Oct.) 1950.

Summary

1. Female mice of the dba and C_3H strains were given low levels (mainly 1 ppm fluorine) of sodium fluoride in the drinking water for periods varying from seven to 17 months.

2. In a series of 12 experiments including 645 animals, the life span of the mice maintained on the treated water was, for the period of the experiment, 9 per cent less than that of the controls drinking distilled water.

3. The total percentage of deaths occurring during the course of each experiment was higher in the fluoridated water groups, as compared with the controls, in 11 experiments and the same in one experiment.

4. Of the 132 months when deaths occurred in one or both of the paired groups, the monthly percentage death rate was the same for five months, higher in the controls for 39, and higher for the mice on fluoridated water for 88 months.

Biochemical Institute
University of Texas.

The Hand and Cardiovascular Disease

DESPITE widespread and sometimes unnecessary use of numerous laboratory tests in day-by-day clinical practice, diagnostic methods that require no special apparatus and that depend only on simple observation can play an effective role in obtaining clinical information about patients. In this connection, the human hand is a unique organ from which an extraordinary amount of clinical information may be derived.

Varied Information Revealed

According to Silverman and Littman,[1] examination of the hand will often disclose interesting and occasionally revealing information about the cardiovascular status of patients. In a general way, the size of the hand is proportional to the rest of the body, and a rough approximation of the cardiac silhouette is obtained by examination of the size of the fist.[2] Under normal conditions the outline of the fist and the orthodiagraphic silhouette coincide, a small fist usually indicating a small heart.

Palmar Sweating and Tremor—Excessive palmar sweating constitutes one of the more striking findings in neurocirculatory asthenia. Sweating of the palms reflects emotional activities; it is increased during tension and excitement, although some degree of palmar sweating does occur in normal persons who are in a state of anticipation. A tremor of wide amplitude may also be detected in patients afflicted with neurocirculatory asthenia. The combination of excessive palmar sweating and a pronounced tremor of the outstretched fingers is a frequent finding in neurocirculatory asthenia and almost never takes place in normal persons.

Cyanosis and Clubbing of the Fingers—These anomalies have long been associated with congenital heart disease. Clubbing of the fingers does not appear at birth and very rarely before the age of 2 years; however, when congenital heart disease is suspected, alert clinicians search for associated congenital anomalies.

Significant Conditions in Diagnosis

Study of the hand is especially re-

(*Continued on page* 189)

[1]Silverman, J. J., and Littman, D. S.: The Cardiologist Looks at the Hand, New England J. Med. **249**:839, 1953.

[2]Roesler, H.: Clinical Roentgenology of the Cardiovascular System: Anatomy, Physiology, Pathology, Experiments and Clinical Applications, Springfield, Illinois, Charles C Thomas, 1937.

The EDITOR'S *Page*

THE MOST recent definition of hypnosis was formulated in 1952: "A suggestively induced state of hypersuggestibility accompanied by various degrees of immobilization of the attention," (*British Encyclopedia of Medical Practice*). In the hynotic trance operative procedures may be performed upon patients without pain. There are no dangers in hypnosis. Its application is limited because of the time involved, the varying degrees of suggestibility among patients, and because of some unfavorable connotations implied. In general, it is less socially acceptable than chemical anesthesia and less generally applicable.

So long as hypnosis is taught by qualified persons with a well-developed professional sense of propriety, there is little danger that it will get out of hand. However, now that mail-order courses are being offered to dentists, it is time to re-evaluate the subject. When a news item in a dental journal announces that a dentist "has added entertainment as a hypnotist to his use of hypnosis in his practice," we should be ready to take a look at ourselves in the unfavorable light in which the public may see us.

There is nothing illegal or unethical in offering a mail-order course in anything. Substantial businesses have been built by selling correspondence courses and thousands of people have had their education expanded by this method. There are some subjects, however, that do not seem to lend themselves to mail-order teaching. Dentistry would be one. Psychotherapy in any form, which certainly includes hypnosis, would appear to be another. The dentist who wishes to add hypnosis to his professional skills should take a *clinical* course in the subject under a qualified teacher.

The dentist who has made hypnosis a parlor trick should be ashamed of himself. The same man would not think of playfully making a mandibular block injection and extracting a tooth as a party feat. If the professional applications of hypnosis are to fall into disrepute, one reason will be because dentists have carried the procedure out of their offices and into the living-room. Let the stage entertainers get the laughs. It is not fitting to the professional tradition.

An English physician, speaking before the British Dental Association, has made this sensible summary of hypnosis in dental practice:[1]

"When all is said and done, hypnotism as a vehicle of treatment remains something which is theoretically fascinating but which, practically, has a very limited field of usefulness. In dental work its only really important sphere of value is as deep hypnotic anesthesia for operations. The number of patients who can reach this desirable state and who are willing subjects is really very small. The number of practitioners who have both the temperament and the interest to become skilled hypnotists is probably even smaller. The chances of these two desiderata, patient and practitioner, coming together is really rather remote. The difficulties outweigh the advantages when one frankly compares the method with the smooth reliability of chemical anesthesia.

"Nonhypnotic suggestion, on the other hand, has always been and will always be of immense practical importance in any human relationship and especially in the professional practitioner-patient relationship.

"Suggestion is best applied unconsciously and implicitly by means of an environment, material and human, which inspires confidence. Such an environment will succeed only if it is based upon real and sincere values. If the practitioner does not feel really confident and justly proud, with all due humility, of his skill and knowledge, then no amount of luxurious furnishings will inspire confidence for long. Provided that the professional knowledge and basic good will are there then a knowledge of the technique of suggestion will enable one to use it to the best advantage; but suggestion applied in the hope of concealing a basic insincerity or lack of knowledge will never work for long."

Dentists have the right under law to use any drugs or any methods that they wish to relieve anxiety, to control pain, and to treat people. Dentists have the responsibility to choose the procedures that can do a job most effectively with the minimum of discomfort or risk to the patient. Hypnotism has a place, but usually in a secondary category to chemical sedatives, anesthetics, analgesics, and obtundents.

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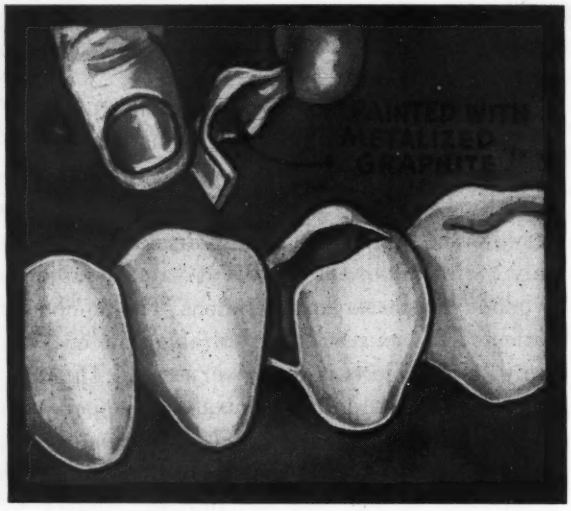
[1]Kitching, E. Howard: Suggestion and Hypnotism in Dental Practice, Br. Dent. J. **95**:237 (Nov. 17) 1953.



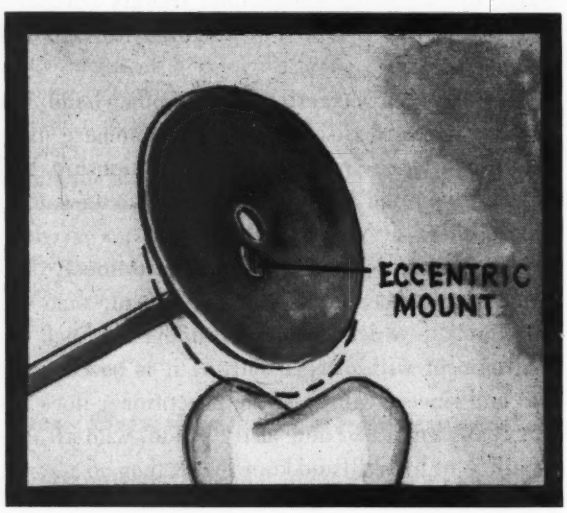
1

Clinical and Laborato

Relieving Castings

C. H. Woodward, D.D.S., Mexico, D.F.

1. To relieve inlays or other small castings that fail to go to place, paint the inside surface with graphite—the kind used for making copper-plated dies. Dry the tooth and place the casting in position. The point of interference will be shown as a bright spot on the casting and as a dark spot on the tooth.

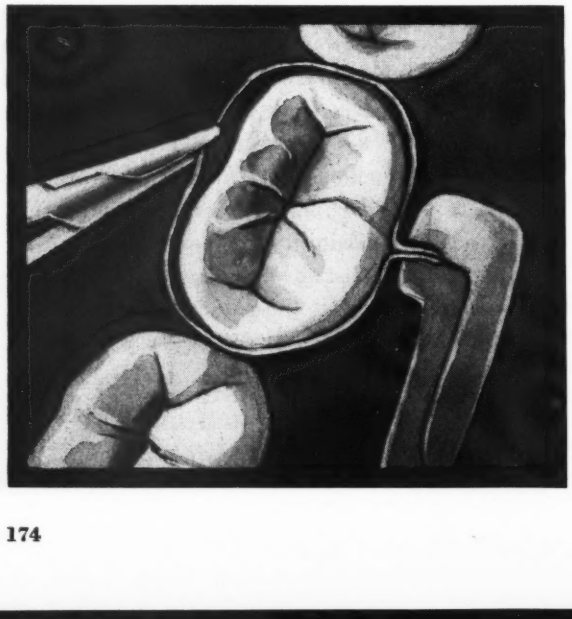


2

Mounting Discs

Charles J. Pearson, D.D.S., Anchorage, Alaska

2. By mounting a sandpaper disc eccentrically better vision is afforded during use. This is in effect, similar to the "window" diamond disc.



3

Removal of a Matrix Band

William W. McGrannahan, D.D.S., Kansas City, Missouri

3. After the amalgam has been packed and a preliminary carving is completed, the matrix band may be removed with less chance of fracture of the amalgam if a small hemostat is attached to the band opposite the band holder. This will give equalized forces on both sides of the band and minimize binding.

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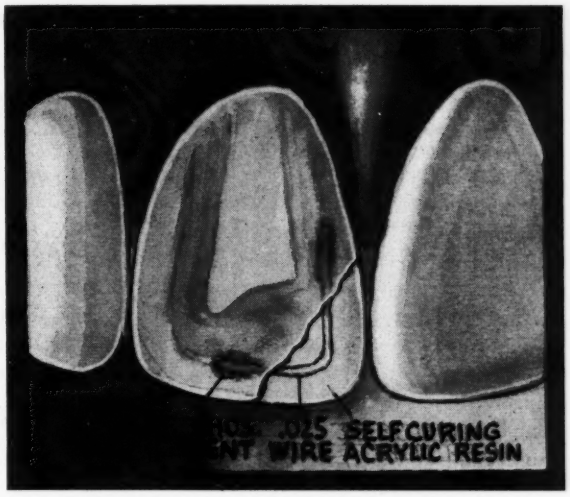
SUGGESTIONS . . .

Restoration for Fractured Anterior Teeth

T. D. Schaad, D.D.S., Kansas City, Missouri

4. The rough edges of all fractures should be reduced. Using a 702 fissure bur sink two pinholes at the enamel dentin junction. Contour a .025 wire to fit in these prepared holes so as to spring into position. Cement the wire with zinc oxide cement. Restore the angle with self-curing acrylic.

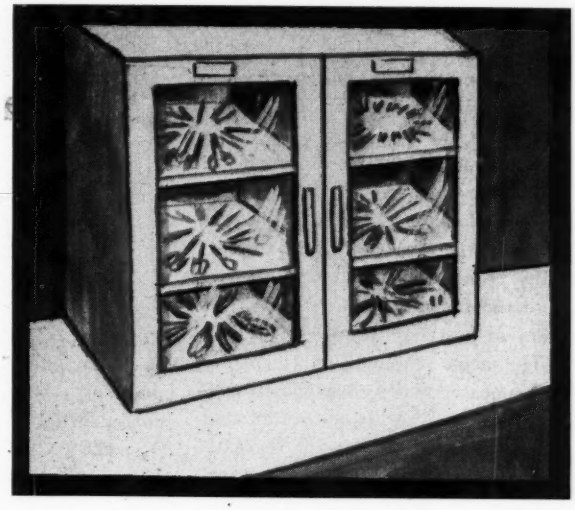


4

Arranging Surgical Instruments in Cabinet

Martin Greenberg, D.D.S., Ithaca, New York

5. If the instruments are arranged in a circular fashion in the instrument cabinet they are easier to identify and to select for use.

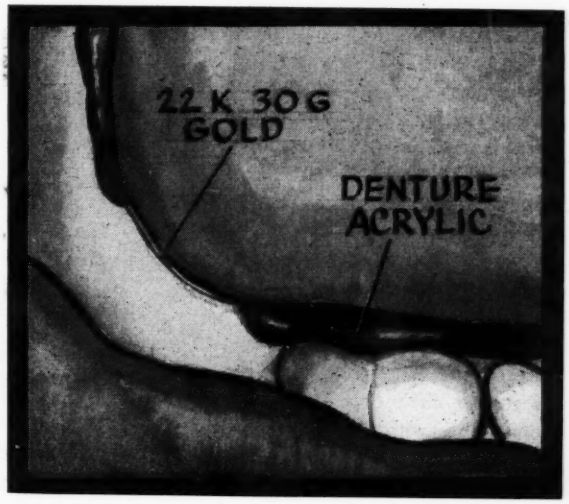


5

Thinning Tuberosity of Denture

William E. Reilly, D.D.S., Wilkes-Barre, Pennsylvania

6. Where the bite is close and there is interference in the tuberosity area of a full upper denture, this part may be thinned by covering the part with a piece of 22-carat, 30-gauge gold, the ends of which are embedded in the denture material.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 186 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

MEDICINE *and the Biologic Sciences*

Bed Rest in the Aged

Some clinicians maintain that the current trend to keep old as well as young patients ambulatory is being overemphasized. This is particularly true in geriatric cases where bed rest is essential in many cases.

The advantages of prudent bed rest prevail over the disadvantages. Many more lives are saved than endangered by the bed. Many more complications are prevented than caused.

The slightest strain or effort, such as leaving the bed for stool or chair, can often mean the difference between recovery or relapse in the patient seriously ill with pneumonia, other acute infectious disease, or chronic heart condition. Exposure is also dangerous, especially in respiratory infections.

Complete bed rest is paramount in all the respiratory and most of the acute abdominal conditions, such as appendicitis and cholecystitis. Mortality is high if strict bed rest is not observed for older patients with primary or postinfection pneumonia.

The acute and chronic forms of orthopnea caused by various circulatory and respiratory disorders and attacks are eased by placing the patient in a chair. Bed rest is imperative, however, in other acute infections, such as endocarditis, pericarditis and most important of all, acute coronary thrombosis.

The arguments to restrict bed rest in myocardial infarction are flimsy. The danger of venous thrombosis in the legs can be prevented in bed. Embolization in coronary thrombosis results mainly from intracardial not peripheral thrombosis. A prolonged period of rest often decides the subsequent course of the disease, the degree of compensation, the frequency of angina pectoris and the recurrence of coronary failure.

In chronic circulatory afflictions bed rest or chair depend on the individual case with as much mobility left to the patient as safety permits. Robust persons with bland phlebitis, mostly a complication of varicosities, must not be compelled to remain in bed. These same persons should be allowed more freedom following abdominal or chest operations.

In general, whenever a senile patient in an acute illness or an exacerbation of a chronic disease: (1) becomes febrile, (2) become weak and fatigued, (3) becomes paler or more cyanotic than usual, (4) has lower blood pressure, (5) has a more frequent or smaller pulse, and (6) has an increased white blood count or sedimentation rate, he should be in bed.

Mueller, DeHam Albert: Bed Rest in the Aged, J. Mt. Sinai Hosp. **19**:131-137 (*July*) 1952.

Disturbance of Normal Bacterial Ecology by Antibiotics

The complex balance that exists among the microorganisms that constitute the normal flora of the human body may be disturbed by prolonged administration of the newer antibiotics. This may result in development of secondary vitamin deficiencies or evolution of new infectious disease syndromes.

Prolonged treatment with penicillin suppresses or eliminates gram-positive bacteria and stimulates directly or indirectly multiplication of gram-negative bacilli. Prolonged therapy with relatively large doses of streptomycin may suppress the gram-negative bacilli and stimulate the growth of gram-positive cocci. The prolonged administration of both penicillin and streptomycin simultaneously or of aureomycin, chloramphenicol, or terramycin may suppress both gram-positive cocci and gram-negative bacilli to such a degree that the fungi of the normal flora multiply and produce disease in the mouth, vagina, bronchi, lungs, and intestinal tract.

The newer broad spectrum antibiotics should not be administered for more than one week at a time unless the agent causing the infection has been identified and the indications for prolonged treatment are obvious. A complete vitamin supplement should be given to all patients receiving prolonged treatment with the newer antibiotics. There should be special emphasis on the B complex group of vitamins.

Antibiotics should not be used in mild and ill-defined infections because a drug sensitivity may develop that will prevent the subsequent use of the antibiotic in a major illness. The dangers of inducing sensitivity seem to be greatest when the antibiotic is applied locally.

Smith, D. T.: Disturbance of Normal Bacterial Ecology by Administration of Antibiotics with Development of New Clinical Syndromes, Ann. Int. Med. **37**:1135-1144 (*December*) 1952.

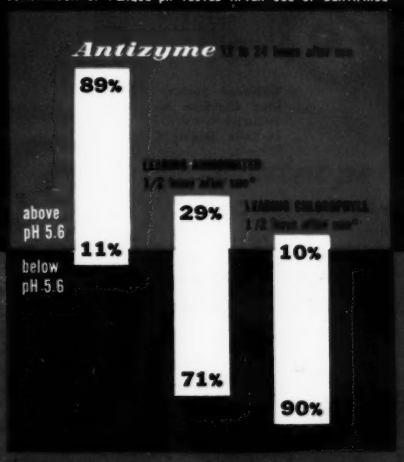
Adolescent Nutritional Problems

It is quite generally recognized today that there is a sharp increase in dental caries in adolescents. The period between childhood and adulthood is frequently one of medical neglect.

all day protection from the cariogenic pH zone [pH 5.5 and below] with

In 89% of caries-susceptible persons tested, Antizyme, with routine brushing, maintained a continuous plaque pH of 5.6 and above.
No dentifrice before this ever provided such extended caries protection.

COMPARISON OF PLAQUE pH TESTED AFTER USE OF DENTIFRICE



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†"*A New Approach to the Problem of Dental Caries Control*": *J. Dent. Research (Aug.) 1955.*

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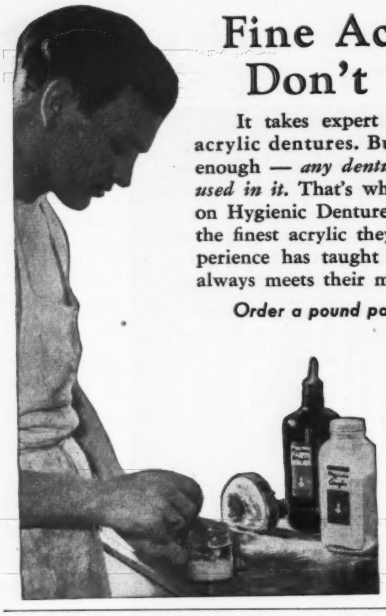

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The rate of growth is extremely rapid during adolescence. It varies greatly for persons even of the same chronologic age. For girls, height increments increase from about nine to twelve years, then drop gradually to maturity. Boys show similar growth increase about three years later. The weight increases at somewhat the same ages. At about thirteen the amount of gain for the boys passes that for the girls.

Ordinarily the basal metabolic rate has a prepubertal rise and a postpubertal fall. Because of unusually strong individual variations at this age, 20 per cent plus or minus is accepted as within normal limits. As a rule, the total caloric requirements are about 1.9 times the basal requirements.

Usually nitrogen storage increases during early puberty and then decreases steadily to the end of adolescence. If care is not taken, the decrease may accelerate until the nitrogen balance is negative. For adolescents, 15 per cent of the total calories in proteins is usually ample. This amounts to 90 to 120 grams of proteins daily. The daily items that will supply the protein needs are: (1) 1 quart of milk, (2) 1 egg, (3) 2 slices of bacon, (4) 1 serving of cheese, and (5) 1 liberal portion of meat.

Calcium retention parallels nitrogen retention. The optimum total daily intake of calcium is 1.5 grams. This is contained in the foods which supply proteins plus the usual fruits and vegetables. To utilize this intake properly about 1,000 units of vitamin D daily are necessary.

With diminished nitrogen-calcium balance and decreased resistance, increased rates of reinfection types of tuberculosis are more likely to occur. Chest roentgenograms should be made at least yearly for adolescents.

Iodine may be supplied adequately in iodized salt if it is not present in fruits and vegetables.

Obesity in the adolescents leads to many psychologic problems. Obese adolescents frequently try to reduce by diets which are inadequate and unsound. Ideal treatment include a low caloric intake high in proteins, cal-

cium, and vitamins. The protein consumption should be about 20 per cent of the total calories.

Fischer, Carl C.: Nutritional Problems in Adolescence, Am. Practit. 3:968-972 (*November*) 1952.

Chapping of the Skin

The weather changes, dew point, and barometric pressure contribute much to chapping of the skin. The skin suffers from rapid desiccation, particularly when an interval of low barometric pressure and extremely moist air is followed by sudden high pressure and dryness with low dew point. The dew point, or temperature at which moisture begins to condense into visible form, is a useful index of actual humidity. Chapping is often severe with low values.

Lesions are most frequent from November through January. Chapping is hastened by wind or wetting of the skin and quick evaporation. Dryness may be increased by hot water, soap, or the oils, lotions and creams used for protection. Even hospital patients may be affected by winter weather. A day's injury sometimes takes weeks to heal.

Changes vary from dryness and itching to erythema, papulation, edema, fissures, bleeding and crusting, or full-blown nummular eczema. Irritating medicaments should be removed. Comfort may be restored by artificial humidification and a layer of stockinette over affected areas.

Gaul, L. Edward, and Underwood, G. B.: Relation of Dew Point and Barometric Pressure to Chapping of Normal Skin, J. Invest. Dermat. 19:9-19 (*July*) 1952.

Multiple Sclerosis Treatment

In multiple sclerosis the tissue damage responsible for the acute symptoms arises from local hypoxia caused by vasospasm or thrombosis. If the blood supply can be effectively restored before irreparable damage has been done and maintained until the unknown forces which produce the spasm or thrombosis have caused to operate, the patient may derive remission without sequelae.

The therapeutic results with multiple sclerosis are notoriously difficult to assess. However, some acute symptoms are apparently reduced or abolished by vasodilating drugs employed before the changes have become irreversible. Once tissue death has occurred, no benefit can be expected from this method. Therefore, old symptoms cannot be treated successfully by vasodilating drugs.

The vasodilator employed can be one of a considerable variety. It must be a fast-acting preparation such as: (1) histamine, (2) amyl nitrite, (3) papaverine hydrochloride, (4) nicotinic acid, (5) benzazoline, or (6) tetra ethylammonium chloride.

The following factors must be considered in any treatment plan for

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acute episodes: (1) The response of the new symptoms to vasodilation should be tested as soon after onset as possible.

(2) If the symptom is altered, the length of the effect should be learned, regardless of the duration of the flush.

(3) The administration of each dose should be scheduled for application immediately before the disappearance of the previous drug's effect.

(4) This schedule should be altered if necessary.

(5) When acute danger is past, patients should be trained in self-administration in case a new symptom should make an appearance. Patients should always have the drug available and ready for immediate use.

(6) Anticoagulation procedures must be instituted as soon as disease activity appears. These measures are to be maintained as long as vasodilation treatment is continued.

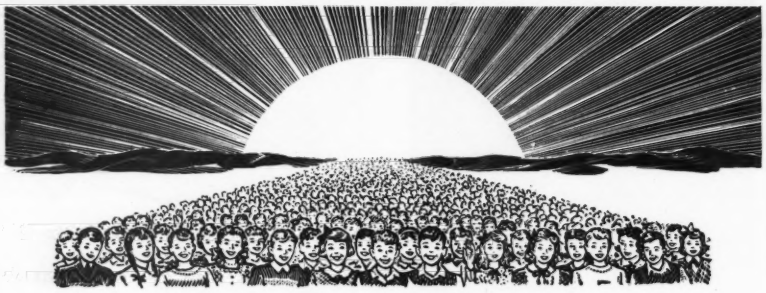
(7) The course of each symptom should be observed frequently and in detail. Routinization of therapy is to be avoided.

(8) An ophthalmologist's services are indispensable. Frequent observation of retinal blood vessels is important to study the course of the disease and note the state of the dilation.

(9) Concomitant blood pressure evaluations are necessary. Appropriate drugs should be used to offset the effects of the dilators in faintness or sudden regression.

Symptoms may not respond for the following reasons: (1) New patients may be treated for symptoms which are old and no longer reversible. (2) Patients may procrastinate in seeking treatment when new symptoms occur. (3) The drug may have paradoxic effects and produce constriction instead of dilation. This has been noted in retinal vessels. (4) Tissue death is sometimes so rapid that treatment is precluded. (5) Rapid lowering of the peripheral blood pressure may increase the hypoxia in the nervous system.

Brickner, Richard M.: Management of Acute Episodes in Multiple Sclerosis, Arch. Neurol. Psychiat. **68**:180-198 (*August*) 1952.



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It has been estimated that it would require 244,000,000 fillings to restore the Dental Health of America's children between 6 and 18. In addition, it would require 33,000,000 fillings every year to keep up with the new cavities. Equally impressive is the fact that our large and expanding youngster population is expected to continue to increase for years and years to come. Here then is a vast market for your services which is practically untouched and which offers exciting opportunities for the future.

Previously comparatively little work was done with primary teeth, because conventional materials made care difficult and unprofitable. Now with Rocky Mountain's Tru-Form Primary Crowns you can successfully restore badly decayed children's teeth in one sitting at a great saving to you and your patient.

TRU-FORM PRIMARY CROWNS are only 30 cents each, introductory assortment of 100, $30.00. Of course, like anything fine in the profession, they require definite operating techniques. For instance: You choose a crown that seems a little small and bell it around the occlusal with RM Posterior Crown Stretcher, so it will fit over the occlusal, Fig. 1. Next, to get the tight "snap fit" around the gingival, you crimp around the gingival with a 112 plier, (Fig. 2) and then finish with a 114 plier, (Fig. 3).

Fig. 1

Fig. 2

Fig 3

You will find the new materials help promote satisfaction and respect and are great practice builders, because the *child of today is your patient of tomorrow.*

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Disease Mechanism

IN THE logical study of any disease we first attempt to identify the characteristic symptoms and signs. Next, we try to correlate these with the pathologic or biochemical changes and, if possible, express them in terms of altered physiology. Then, we try to identify the predisposing or causative factors. Lastly, we try to learn how the 'Bio-amputation corone-radiculaire. particular symptoms appear.

—*From Proceedings of the Institute of Medicine of Chicago* **19**:335 (October 15) 1953.

Contra-Angles

Teeth and the News

A young man who displayed impertinence to a neighboring passenger on a street car lost his two upper centrals from the impact of a fist. That was two years ago but the young man did not have the teeth replaced. He turned to the easy career of banditry and became a member of a gang that specialized in hold-ups of drug stores.

The gang invaded a busy drug store where they stole cash and narcotics. The wife of the owner noticed that one of the bandits was missing his two front teeth. The police went through their files and found that two known drug addicts were similarly deformed by trauma. One of the two was in jail on the day of the crime. The other was picked up by the police. He confessed the hold-up and implicated his three companions.

The moral, if there need be one, is that even a criminal cannot afford to go without dental care.

In the same paper that carried this crime sketch there was the report of an international incident where a tooth was involved. This was the tooth of Buddha that is enshrined in the Temple of the Tooth in Ceylon. This relic is considered to be a sacred object by Buddhists which should make it inviolate from remarks by smart alecks of other faiths. A British magazine writer touched off the international incident and infuriated the five million Buddhists in Ceylon by suggesting that Queen Elizabeth on her world tour should not visit the Temple of the Tooth but should instead send the royal dentist and commission him to act as her proxy.

Buddhism is the religion that flourishes among the Asians whom we are trying to woo from Communism. There are millions of these people who are nervously balanced between

Amco-Facts

If you are still using oxy-phosphate of zinc type cement you should read this carefully. It will make you think.

Zinc cements are . . .

1. **soluble in mouth fluids.**
2. **absolutely non-adhesive.**
3. **structurally weak in thicknesses of less than 100 microns.**

Compare this with what is available today.

AMCO "Life-Time" Cement is . . .

1. **absolutely insoluble in mouth fluids.**
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In addition . . . after you have placed your finest inlay, crown, bridge, or jacket, . . . moisture or mouth fluids will not harm the setting of the cement. Setting occurs in less than five minutes.

The procedure is the same as zinc cements except mixing is simpler.

No spatulation is necessary, only a 3-5 second mixing.

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This is another FIRST for AMCO altho we prefer to think of it as an advance for our profession. Too long have we been using antiquated materials for fillings and cements.

AMCO Life-Time Clear cement is available from your dealer in an introductory kit containing all shades for $10.00

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accepting the Godless Communism of the Russians or the culture of the West. One writer such as "Janus" in the London publication, *Time and Tide*, could turn thousands of Buddhists toward Russia by his intolerant expression involving a relic of their founder who lived six centuries before Christ.

Jumping from Ceylon to the city of Bedford in Indiana and quoting from the Associated Press we are told that in that city the dentists reward children with free ice cream. If it is true, these dentists should be ashamed of themselves. We are certain that refined sugar in any form is cariogenic. It may be even more devastating to the body chemistry. This was the story as it was carried on the press wires throughout the country:

"Parents in this southern Indiana city don't have any trouble getting their youngsters to visit the doctor—or the dentists. They usually jump at the chance.

"Each young patient is handed an official looking prescription entitling him to one free ice cream cone at any of Bedford's six drugstores.

"In the last six years, doctors and dentists have handed out approximately 27,000 such prescriptions for 'a cone of any flavor . . . to be eaten at once.'

"A local dairy provides the ice cream."

Are dental faces red in Bedford? They should be as red as mine was when a young patient in the caries-acne age caught me in a store buying candy shortly after I had given him a lecture on the evils of refined sugar. If I had had the right aplomb on the occasion I would have demanded what *he* was doing there. Instead, *I* looked as the one caught in a nefarious act.

Hold Your Tongue and Your Pen

When you are mad write what you want but don't let anyone see it. When you are mad hold your tongue and your pen. Be quick to hear, slow to speak, slow to anger, even slower to write and entirely incapable to mail your piece.

A beautifully carved new plastic anatomical posterior . . .
a plastic
. . . in a material proven through more than 6 years clinical use
. . . with occlusal forms "synchronized" to eliminate tripping
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It is impossible to "take back" the written word. It stands indestructible over time. It is relatively easy to forget the spoken word. We could all, if we wished to be so unproductively engaged, recall a remark that distressed us. With time, spoken words become dimmed in outline and lose most of their impact of meaning. We can recall, perhaps, that a person said *something* that we didn't like, but to recall it exactly, with the offending tones and overtones is virtually impossible. That is not so with something in writing.

A Tooth by any Name

Highly commendable and desirable is the effort to have uniform nomenclature in any scientific field. When we communicate with one another we have few chances for failure if we are assured that we are using the same words to talk about the same thing. The people following the semantic discipline make a big point of this fact. Before a conference sponsored by the American Dental Association these thoughts on dental terminology were expressed by Doctor Donald C. Washburn:

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Synchronized

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or you can use with complete confidence

An anatomical form that eliminates tripping —

in a plastic material of proven durability.

- Synchronized occlusal forms eliminate tripping (which does double damage by trauma to tissue and excessive wear of teeth).
- The most durable tooth resin known (proven in more than six years use) eliminates excessive wear.

It's this happy combination of form and material that makes Myerson's Synchronized Posterior a tooth you can use with complete confidence. Check these other important advantages:

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"Within recent years, probably as a result of pathologic theories, especially regarding periodontal disease, a tendency has become manifest to enlarge the concept of tooth and to symbolize the concept by a suitable term. Weski chose the name *organum dentale* and included within the concept enamel, dentin, pulp, cementum, periodontal membrane, and alveolar bone. For the same concept, Graaf, and later Hulin, have coined the term *odonton*.

"The divisions or parts of this 'whole tooth' concept have been variously made and named. Weski includes enamel, dentin, and pulp in the *noyau dentaire* (dental core), and assigns the rest of the tissues to the *paradentium*. Schour, in this country, has indicated the *propriodontal* tissues as enamel and dentin; pulp tissue belongs to the endodontal tissues; following account: The development considers the *endodont* or *endodontium* to be enamel, dentin and pulp.

"The idea of integrating the dental elements further is advanced by Hulin, who distinguishes between an internal articulated combination of

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 174 *and* 175)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

two teeth, consisting of (presumably) the clinical roots and their attachments, called the *synodont,* and the two opposing clinical crowns, called the *odontribe.* The complete set of odontribes for the mouth is called the *stomeodontribe.* The stomeodontribe with all its appendages necessary for its function constitutes the *stomeodontal region.*

"Another term of interest is *sosiodontie* or *sosidontia*—the science which aims at the preservation of the teeth in a healthy state. Professor J. B. de Boer of the University of Groningen is responsible for this term and a number of others in the following account: The development of a field into a special science, creates the demand for a scientific nomenclature. The restoration of teeth by means of fillings still forms the essential work of the general practitioner, and therefore is not regarded as a specialty. Here probably lies the explanation of the fact, that apparently the need has never been felt to indicate this field of dentistry with a scientific name, notwithstanding the fact that it has been raised to a scientific plane for quite some time. But Operative Dentistry also asks for a new, scientific and universal name.

"At my request, Doctor P. J. Enk, professor of Latin at the State University in Groningen has coined the word *Sosiodontia,* derived from the Greek words *sozo,* meaning to save, to preserve, and *odous,* meaning tooth. Sosiodontia then, I should like to define as the science which aims at the preservation of the teeth in a healthy state.

"For *filling* teeth Professor Enk suggested the name *Plerodontia,* from the Greek words *pleroo,* to fill, to complete, and *odous,* meaning tooth.

"The term cavity preparation used in a general sense is not quite right; we do not always prepare 'cavities.' Professor Enk coined the word *Tomodontia* from *temo,* to cut, *odous,* tooth. But of course a 'cavity' will always have to be 'prepared.'

"*Desmodont* is a term proposed by H. Muhlemann (Paradentologie 3:89-90, 1949) for the periodontal membrane or dental ligament In the

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that no other type of restoration can compare (mouth conditions permitting) with a *fixed bridge;* and that the ideal tooth for bridgework is Steele's Trupontic tooth.

They have the right idea.

- ✓ Steele's Trupontics restore the full contour of the lost natural teeth, providing a restoration that feels more natural, and is more sanitary.
- ✓ Only porcelain comes in contact with tissue, and nothing is kinder to tissue than glazed porcelain.
- ✓ Perfectly suited to immediate extraction cases.

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former term the word *membrane* gives a false impression of the physiologic function of the tissue. Periodontal in this connection is not entirely satisfactory either, if the cementum is considered as supporting tissue.

"J. Filderman, in an article on errors and omissions in dental terminology, calls attention to numerous terms which lead to confusion and which he considers prejudicial to professional prestige. He takes exception to the term *devitalization,* which gives the false impression that the tooth is dead when, as he states, a pulpless tooth not only goes on living but very often proves to be of greater vitality than teeth which have not lost their pulps. He suggests instead the term *depulpation.* He feels that it is time to wage a campaign for the suppression of certain expressions which we continue to use without reason since they are devoid of sense. Among these are *kill the nerve* for *kill the pulp* and *amputation of the pulp; tire-nerf* for *sonde barbelee; gangrene* rather than *mortification pulpaire;* and, of course, the elimination of *dead tooth.* He objects to *pivot tooth* when the essential qualification of this restoration is that it does not pivot. He would restore the term *dent a tenon* (in English *post crown* or *dowel crown*) which is the term which Fauchard, the inventor, used to describe this prosthesis at the beginning of the 18th century. He considers that the term *courrone* (crown) evokes a misleading mental image and suggests *coiffe* (cap) as preferable. *Plombage en or* he finds paradoxical, and of course, only French used *leading* in this sense. Filderman states that he is also looking for a general term, which he has not yet found, to indicate the persons to whom dentists dispense their treatments. Since these people are not always sick or ill people they cannot be reasonably called patients or clients. And, although these people do consult the dentists, they cannot be called *consultants* without causing confusion. This does not seem like a real problem; if dentistry is a health service, the recipients are *patients.*

Why

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"Filderman suggests that the vague term *pulpectomie* be abandoned for his *depulpation.* He suggests the use of the prefix *bio*—from the Greek *bios* and *necro*—from *necros* with *amputation.* Thus, if called upon to remove some of a living pulp, we can use the terms:

"Bio-amputation corone-pulpaire (amputation of the living crown pulp, etc.)

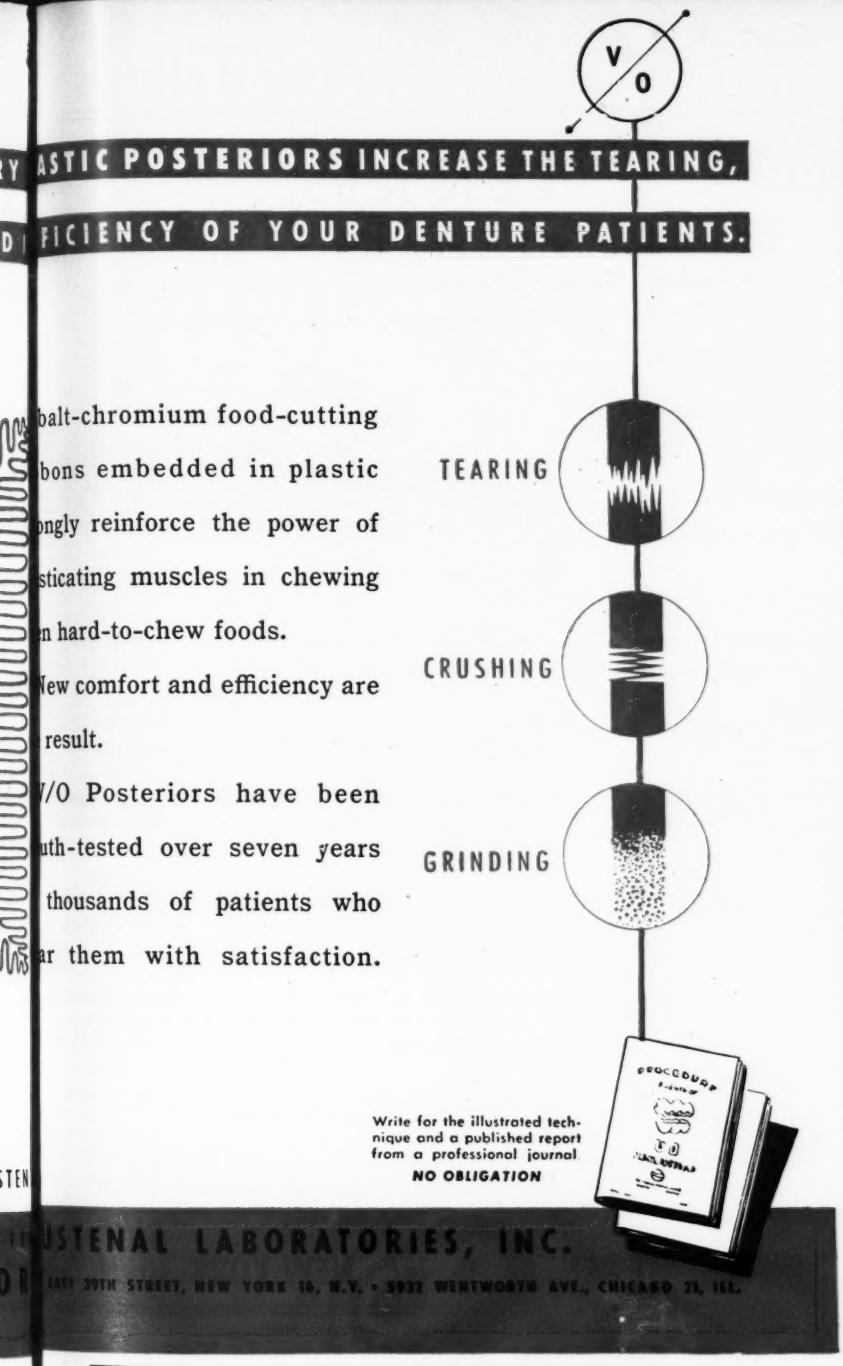
"Bio-amputation corone-radiculaire.

"Bio-amputation pulpo-radiculaire.

"The combinations would be similar for the root *necro*—.

"Held uses the term *parodontolyze* to group the aggregate of affections characterized by the phenomena of resorption of the alveolar bone, even if these affections have different origins. Periodontal disease is the equivalent in English."

We should have a clear and unmistakable nomenclature. There is always the danger, however, that we may get so complicated in our words and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abstruse in our expressions that we will speak and write *less* clearly. The primary function of any form of communication is to express a thought. The less encumbered and the more vigorous the expression, the better.

—E.J.R.

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The Hand and Cardiovascular Disease

(*Continued from page* 172)

warding in the case of subacute bacterial endocarditis. Diagnosis of this disease is sometimes established initially by information supplied solely by the hand. According to Libman,[3] a diagnostic sign pathognomonic of subacute bacterial endocarditis is supplied by the so-called Osler node, which consists of a small, tender red nodule located in the pads of the finger or in the thenar of hypothenar eminences. Pallor is a more or less constant finding in subacute bacterial endocarditis; the degree of pallor can be determined by observing the color of the palms. Wintrobe[4] asserts that the palmar site is more reliable for judging pallor than mucous membranes or conjunctivas.

Thyroid Function Imbalance—A clue to the existence of endocrine disturbances is also supplied by the hand. In hyperthyroidism, the hands are tremulous, flushed-warm and moist, with the skin smooth and satiny; in hypothyroidism, the hands are dry, rough, and cold. The hand of a cretin is characteristically underdeveloped, while the hand of an acromegalic person is large, broad, and usually coarse and swollen.

Signs Suggestive of Functional Disturbance—The shoulder-hand syndrome is a disabling complication of myocardial infarction, which is characterized initially by a great deal of pain, stiffness, and limitation of motion of the shoulder joint and girdle, and is followed by involvement of the hands and fingers. Two signs of the hand suggestive of disturbance in liver function are thought to occur: erythema of the palms and spider angiomas or pulsating vascular nevi.

Study of Peripheral Circulation—The hands are admirably suited for study of the dynamics of peripheral circulation.[5] The color and temperature of the skin of the hands sometimes yield more information of impending shock than either the pulse or the blood pressure. Indeed, a warm, pale hand abruptly changing in appearance during illness to a cold, deeply colored, cyanotic state supplies dramatic evidence of peripheral circulatory failure.

From Editorials and Comments, *Journal of the American Medical Association* **154**:508 (Feb. 6) 1954.

[3]Libman, E.: Diseases of the Heart, Philadelphia, W. B. Saunders Company, 1949.

[4]Wintrobe, M. M.: Clinical Hematology, ed. 3, Philadelphia, Lea & Febiger, 1951.

[5]DiPalma, J. R.: Circulation in Skin in Shock Syndrome: Comparison of Simple Prognostic Features of Clinical Value, JAMA **123**:684 (Nov. 13) 1943.

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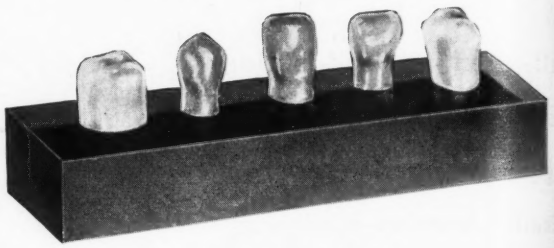

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